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GOVERNMENT REPORTS

ANNOUNCEMENTS & INDEX

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GOVERNMENT REPORTS
ANNOUNCEMENTS & INDEX

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Rogers C. B. Morton, Secretary
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William T. Knox, Director

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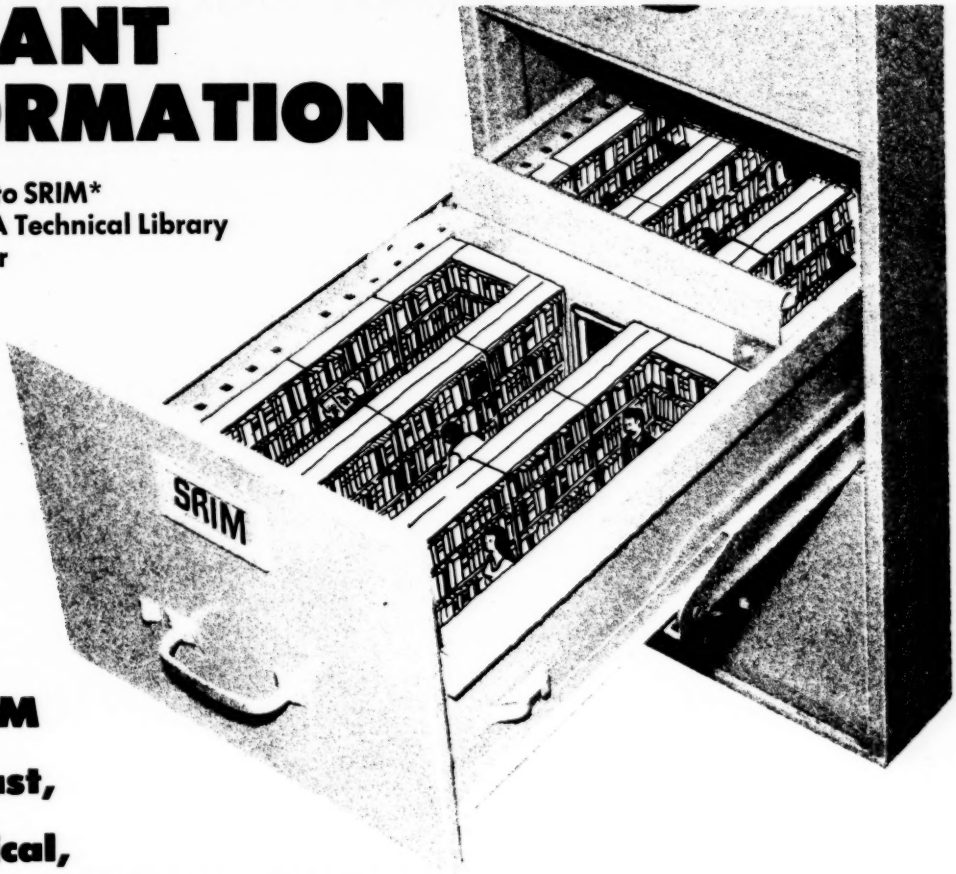

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GOVERNMENT REPORTS ANNOUNCEMENTS & INDEX

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Subject Field & Group Structure

(Use Edge Index on back cover to locate subject field in the journal)

FIELD 1. AERONAUTICS. Includes the following Groups: Aerodynamics; Aeronautics; Aircraft, Aircraft Flight Control and Instrumentation; Air Facilities.

FIELD 2. AGRICULTURE. Includes the following Groups: Agricultural Chemistry; Agricultural Economics; Agricultural Engineering; Agronomy and Horticulture; Animal Husbandry; Forestry.

FIELD 3. ASTRONOMY AND ASTROPHYSICS. Includes the following Groups: Astronomy; Astrophysics; Celestial Mechanics.

FIELD 4. ATMOSPHERIC SCIENCES. Includes the following Groups: Atmospheric Physics; Meteorology.

FIELD 5. BEHAVIORAL AND SOCIAL SCIENCES. Includes the following Groups: Administration and Management; Documentation and Information Technology; Economics; History, Law, and Political Science; Human Factors Engineering; Humanities; Linguistics; Man-machine Relations; Personnel Selection, Training, and Evaluation; Psychology (Individual and Group Behavior); Sociology.

FIELD 6. BIOLOGICAL AND MEDICAL SCIENCES. Includes the following Groups: Biochemistry; Bioengineering; Biology; Bionics; Clinical Medicine; Environmental Biology; Escape, Rescue, and Survival; Food, Hygiene and Sanitation; Industrial (Occupational) Medicine; Life Support; Medical and Hospital Equipment; Microbiology; Personnel Selection and Maintenance (Medical); Pharmacology, Physiology; Protective Equipment; Radiobiology; Stress Physiology; Toxicology; Weapon Effects.

FIELD 7. CHEMISTRY. Includes the following Groups: Chemical Engineering; Inorganic Chemistry; Organic Chemistry; Physical Chemistry, Radio and Radiation Chemistry.

FIELD 8. EARTH SCIENCES AND OCEANOGRAPHY. Includes the following Groups: Biological Oceanography; Cartography; Dynamic Oceanography; Geochemistry; Geodesy; Geography; Geology and Mineralogy; Hydrology and Limnology; Mining Engineering; Physical Oceanography; Seismology; Snow, Ice, and Permafrost; Soil Mechanics; Terrestrial Magnetism.

FIELD 9. ELECTRONICS AND ELECTRICAL ENGINEERING. Includes the following Groups: Components; Computers; Electronic and Electrical Engineering; Information Theory; Subsystems; and Telemetry.

FIELD 10. ENERGY CONVERSION (Non-propulsive). Includes the following Groups: Conversion Techniques; Power Sources; Energy Storage.

FIELD 11. MATERIALS. Includes the following Groups: Adhesives and Seals; Ceramics, Refractories, and Glasses; Coatings, Colorants, and Finishes; Composite Materials; Fibers and Textiles; Metallurgy and Metallography; Miscellaneous Materials; Oils, Lubricants, and Hydraulic Fluids; Plastics; Rubbers; Solvents, Cleaners, and Abrasives; Wood and Paper Products.

FIELD 12. MATHEMATICAL SCIENCES. Includes the following Groups: Mathematics and Statistics; Operations Research.

FIELD 13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING. Includes the following Groups: Air Conditioning, Heating, Lighting, and Ventilating; Civil Engineering; Construction Equipment, Materials, and Supplies; Containers and Packaging; Couplings; Fittings, Fasteners, and Joints; Ground Transportation Equipment; Hydraulic and Pneumatic Equipment; Industrial Processes; Machinery and Tools; Marine Engineering; Pumps, Filters, Pipes, Fittings, Tubing, and Valves; Safety Engineering; Structural Engineering.

FIELD 14. METHODS AND EQUIPMENT. Includes the following Groups: Cost Effectiveness; Laboratories, Test Facilities, and Test Equipment; Recording Devices; Reliability; Reprography.

FIELD 15. MILITARY SCIENCES. Includes the following Groups: Antisubmarine Warfare; Chemical, Biological, and Radiological Warfare; Defense; Intelligence; Logistics; Nuclear Warfare; Operations, Strategy, and Tactics.

FIELD 16. MISSILE TECHNOLOGY. Includes the following Groups: Missile Launching and Ground Support; Missile Trajectories; Missile Warheads and Fuses; Missiles.

FIELD 17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES. Includes the following Groups: Acoustic Detection, Communications, Direction Finding; Electromagnetic and Acoustic Countermeasures; Infrared and Ultraviolet Detection; Magnetic Detection; Navigation and Guidance; Optical Detection; Radar Detection; Seismic Detection.

FIELD 18. NUCLEAR SCIENCE AND TECHNOLOGY. Includes the following Groups: Fusion Devices (Thermonuclear); Isotopes; Nuclear Explosions; Nuclear Instrumentation; Nuclear Power Plants; Radiation Shielding and Protection; Radioactive Wastes and Fission Products; Radioactivity; Reactor Engineering and Operation; Reactor Materials; Reactor Physics; Reactors (Power); Reactors (Nonpower); SNAP Technology.

FIELD 19. ORDNANCE. Includes the following Groups: Ammunition, Explosives, and Pyrotechnics; Bombs; Combat Vehicles; Explosions, Ballistics, and Armor; Fire Control and Bombing Systems; Guns; Rockets; Underwater Ordnance.

FIELD 20. PHYSICS. Includes the following Groups: Acoustics; Crystallography; Electricity and Magnetism; Fluid Mechanics; Masers and Lasers; Optics; Particle Accelerators; Particle Physics; Plasma Physics; Quantum Theory; Solid Mechanics; Solid-state Physics; Thermodynamics; Wave Propagation.

FIELD 21. PROPULSION AND FUELS. Includes the following Groups: Air-breathing Engines; Combustion and Ignition; Electric Propulsion; Fuels; Jet and Gas Turbine Engines; Nuclear Propulsion; Reciprocating Engines; Rocket Motors and Engines; Rocket Propellants.

FIELD 22. SPACE TECHNOLOGY. Includes the following Groups: Astronautics; Spacecraft; Spacecraft Trajectories and Reentry; Spacecraft Launch Vehicles and Ground Support.

Sample Entries

Report entries are arranged by COSATI group and field. Within fields they are arranged alphanumerically by Accession (Order) Number - alphabetic data precedes numeric.

AD/A-003 266/4GA PC$6.25/MF$2.25
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
PROJECT THEMIS: A CENTER FOR REMOTE SENSING.
Final rept. 16 Sep 67-15 Sep 73,
F.T. Ulaby, and R.K. Moore, Jun 74, 172p Rept no. CRES-TR-133-29 ETL-CR-74-10
Contract DAAK02-68-C-0089
See also AD-743 234.

Descriptors: *Radar mapping, *Target discrimination, Aerial reconnaissance, Data processing equipment, Preprocessing, Microwaves, Ultrasonic radiation, Image Intensification, Backscattering, Agriculture, Vegetation, Land use, Soils, Scattering, Spectrometry.
Identifiers: Themis project, *Remote sensing.

This report summarizes the technical work accomplished under Project THEMIS, A Center for Remote Sensing at the University of Kansas during the period 16 September 1967 through 15 September 1973. The highlights of the four major areas forming the remote sensing system are presented. A detailed description of the latest radar spectrometer results is presented.

Index entries are arranged alphanumerically. Titles are included in all indexes except Contract Number Index. Sample entries for each index follow:

Subject: Entries are sequenced by major subject term, second paired term, and accession number.

RADAR MAPPING
Project THEMIS: A Center for Remote Sensing.
AD/A-003 266/4GI

Personal Author: Entries are sequenced by personal author, report title, and accession number.

MOORE, R. K.
Project THEMIS: A Center for Remote Sensing.
AD/A-003 266/4GI

Corporate Author: Entries are sequenced by corporate author name, report number, and accession number. The monitor agency number is given following the report title.

KANSAS UNIV/CENTER FOR RESEARCH INC LAWRENCE REMOTE SENSING LAB
CRES-TR-133-29
Project THEMIS: A Center for Remote Sensing.
(ETL-CR-74-10)
AD/A-003 266/4GI

Contract Grant Number: Entries are sequenced by contract or grant number, corporate author, and accession number.

DAAK02-68-C-0089
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
AD/A-003 266/4GI

Accession/Report Number: Entries are sequenced by accession, report, or monitor agency number. Prices are given in this index.

AD/A-003 266/4GI
Project THEMIS: A Center for Remote Sensing.
AD/A-003 266/4GI 8F PC$6.25/MF$2.25

REPORTS & TRANSLATIONS

1. AERONAUTICS

1A. Aerodynamics

AD-A011 135/1GA PC$3.75/MF$2.25
Naval Ship Research and Development Center Bethesda Md Aviation and Surface Effects Dept
Subsonic Force Characteristics of a Low Aspect Ratio Wing Incorporating a Spinning Cylinder.
Final rept.,
David G. Lee. Jun 74, 27p Rept no. ASED-329

Descriptors: *Lifting surfaces, *Cylinders, *Spinning(Motion), *Wings, Aspect ratio, Magnus effect, Wind tunnel models, Wind tunnel tests, Aerodynamic characteristics, Flaps(Control surfaces), Sideslip, Angles, Surface navigation, Underwater navigation, Subsonic characteristics.
Identifiers: Low aspect ratio, Rotating cylinders.

The effect of a spinning cylinder on the aerodynamics of a low aspect ratio wing was examined in a subsonic wind tunnel program. Results show little effect with the cylinder in the wing leading edge for a velocity parameter of 5 and flow angles relative to the wing up to 16 degrees. However, similar flow conditions with the cylinder relocated to the trailing edge, produce a doubling in the force coefficient. An undeflected flap added to the trailing edge cylinder model nullifies the cylinder's effect. With the flap deflected 30 degrees, large increases in the force coefficient occurred at moderate sideslip angles.

AD-A011 270/6GA PC$3.75/MF$2.25
Army Aviation Systems Command St Louis Mo
Rotor Induced Power.
Final rept.,
Milton A. Schwartzberg. May 75, 35p Rept no. USAAVSCOM-TR-75-10

Descriptors: *Helicopter rotors, *Power measurement, Velocity, Flow fields, Thrust, Hovering, Level flight, Climbing.
Identifiers: Induced power.

Methodology is presented for rapid estimation of the induced power requirements of a helicopter rotor. Operating ranges treated are hover in or out of ground effect, vertical climb, and level flight. Earlier work on this subject is modified by more recent flight test information on ground effect; enlarged in scope by the consideration of a generalized trapezoidal inflow velocity scope by the consideration of a generalized trapezoidal inflow velocity distribution at the rotor; and refined to account for the influence of level flight on the effect of a nonuniform induced velocity distribution at the rotor.

AD-A011 596/4GA PC$4.25/MF$2.25
Ohio State Univ Research Foundation Columbus
An Experimental Study of Boattail Pressures at High Subsonic Mach Numbers and High Reynolds Numbers.
Final rept. 1 Jul 73-30 Jun 74,
John D. Lee. Mar 75, 61p ARL-75-0014
Contract F33615-73-C-4165

Descriptors: *Aerodynamics, *Boattail afterbodies, *Subsonic characteristics, Flow fields, Aircraft, Aerodynamic drag, Boundary layer flow, Model tests, Flow separation, Pressure distribution, Computer applications, Wind tunnel tests, Data acquisition, Walls, Interference, Interactions, Inviscid flow, Viscous flow.
Identifiers: Design criteria, Wall effect.

This study was undertaken to obtain information on the flow over aft-body boattails at high subsonic speeds and at Reynolds numbers representative of the flight range of aircraft. Since the drag of an aircraft is associated with structure surrounding the engine nozzle, the design of that part must depend upon an accurate knowledge of the associated flow field. The covergent shape of the boattail results in a rising pressure, but this produces a thickening and eventual separation of the boundary layer. The effects of the interaction between the viscous and inviscid parts of the flow field form the main objective of this study.

N75-22275/2GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
Comparisons of Wing Pressure Distribution from Flight Tests of Flush and External Orifices for Mach Numbers from 0.50 to 0.97.
L. C. Montoya, and D. P. Lux. Apr 75, 26p NASA-TM-X-56032

Descriptors: *Flight tests, *Orifices, *Pressure distribution, *Wings, Mach number, Pressure measurements.

For abstract, see STAR 1314

N75-22276/0GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
An Approximate Closed-Form Solution for Lead Lag Damping of Rotor Blades in Hover.
D. A. Peters. Apr 75, 27p NASA-TM-X-62425, A-6025
Subm-Prepared in Cooperation with Army Air Mobility R and D Lab., Moffett Field, Calif.

Descriptors: *Damping, *Hovering stability, *Rotary wings, Aerodynamic forces, Coriolis effect, Critical loading, Equations of motion, Helicopter control, Pitch (Inclination), Stiffness, Time lag.

For abstract, see STAR 1314

N75-22280/2GA PC$6.25/MF$2.25
Advisory Group for Aerospace Research and Development, Paris (France).
Aircraft Stalling and Buffeting.
Feb 75, 169p AGARD-LS-74
In English; Partly in French.

Descriptors: *Aerodynamic stalling, *Boundary layer separation, *Buffeting, *Low speed stability, Aircraft performance, Dynamic response, Oscillating flow, Performance prediction, Pressure distribution, Wing oscillations.

For abstract, see STAR 1314

N75-22632/4GA PC$4.75/MF$2.25
Aeronautical Research Inst. of Sweden, Stockholm.
The Solution of the Laminar and Turbulent Three Dimensional Boundary Layer Equations with a Simple Finite Difference Technique.
T. K. Fanneloep, and D. A. Humphreys. 1975, 82p FFA-126

Descriptors: *Finite difference theory, *Laminar boundary layer, *Three dimensional boundary layer, *Turbulent boundary layer, Cross flow, Eddy viscosity, Equations of motion, Isotropy, Swept wings, Transformations (Mathematics).

For abstract, see STAR 1314

N75-22638/1GA PC$4.25/MF$2.25
Imperial Coll. of Science and Technology, London (England). Dept. of Aeronautics.
Reynolds Number Dependence of Skin Friction in Two-Dimensional Rectangular Duct Flow and a Discussion of the Law of the Wake.
R. B. Dean. Dec 74, 56p IC-AERO-74-11

Descriptors: *Ducted flow, *Reynolds number, *Skin friction, *Turbulent wakes, *Two dimensional flow, Bulk modulus, Flow coefficients, Flow distribution, Flow equations, Pressure gradients, Turbulent boundary layer.

For abstract, see STAR 1314

1B. Aeronautics

AD-A011 116/1GA PC$3.25/MF$2.25
Naval Air Test Center Patuxent River Md
Environmental Testing of the Improved Engine and Windshield Anti-Ice and Rotor Blade Deice Systems Installed in the CH-46A Helicopter.
Technical rept.,
Kenneth H. Wilcox. 7 Mar 66, 24p Rept no. NATC-ST-18R-66

Descriptors: *Deicing systems, *Naval aircraft, *Helicopters, *Flight testing, Rotor blades(Rotary wings), Windshields, Engine components, Temperature, Performance, Specifications, Cold weather tests.
Identifiers: CH-46A aircraft, H-46 aircraft, *Antiicing systems.

Engine inlet and windshield anti-ice and rotor blade deice systems were flight tested in natural icing conditions and in an icing cloud. The CH-46A, when configured with Airframe Changes 58, 80, 118, and IBCC 61-777, is suitable for flight in icing conditions at ambient temperatures down to +10F. The inlet anti-ice system failed to meet specification requirements in that when operating in ambient temperatures below +10F, the anti-ice system did not maintain the inlet in an ice-free condition and engine damage from ingested inlet ice occurred. The rotor blade deice system and the windshield anti-ice system met applicable specification requirements and are satisfactory for service use.

AD-A011 544/4GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Long Line Loiter: Potential Shock Hazards of an Airborne Electrically Conductive Line.
Final rept. Mar 70-Apr 71,
Eric J. Jumper, and Charles A. Bell. Jun 73, 23p Rept no. AMRL-TR-71-109

Descriptors: *Aviation safety, *Towing cables, Airborne, Hazards, Electricity, Mechanical cables, Aerial pickup systems, Air drop operations, Cable assemblies, Rescue equipment.
Identifiers: Long line loiter systems.

When a conductive line is towed in a circling-line maneuver by a fixed-wing aircraft, a potential static electricity hazard is developed. This condition is described and analyzed herein. Peak current surges expected for systems with and without ground contact during fair weather conditions are presented. Protection equipment and procedures recommended include grounding the line, the use of special gloves, and avoidance of inclement weather.

N75-22313/1GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Factors Affecting Handling Qualities of a Lift-Fan Aircraft During Steep Terminal Area Approaches.
R. M. Gerdes, and C. S. Hynes. Apr 75, 26p NASA-TM-X-62424, A-6016

Descriptors: *Aircraft performance, *Approach control, *Controllability, *Lift fans, Decelera-

tion, Descent trajectories, Glide paths, Human factors engineering, Longitudinal control, Zero angle of attack.

For abstract, see STAR 1314

PB-242 249/1GA PC$4.25/MF$2.25
Peat, Marwick, Mitchell and Co., San Francisco, Calif.
Review of Aviation Forecasts and Forecasting Methodology,
Dan G. Haney. May 75, 61p DOT-40176-6
Contract DOT-OS-40176

Descriptors: *Air transportation, *Forecasting, General aviation aircraft, Commercial aircraft, Air traffic, Terminal facilities, Air traffic control, Planning.
Identifiers: DOT/4DZ/DA, DOT/3K.

This paper documents a briefing to a special committee appointed by the Secretary of Transportation to study the organizational structure and management approach employed by the Federal Aviation Administration in carrying out its missions. The paper covers the uses of aviation forecasts, the methodologies used in developing forecasts, and a comparison of past forecasts with actual resulting aviation activity. Past uses of aviation forecasts are numerous; however, it is shown that some major policy studies in the past have not incorporated forecasts of aviation activity as part of the analytical process used in reaching recommendations. The methodology used to develop forecasts varies widely, depending on a number of factors.

PB-242 469/5GA PC$13.00/MF$2.25
National Transportation Safety Board, Washington, D.C. Bureau of Aviation Safety.
Aircraft Accident Reports. Brief Format. U.S. Civil Aviation Issue Number 2 of 1974 Accidents.
15 Nov 74, 560p NTSB-BA-74-6
See also Issue 1, PB-236 867.

Descriptors: *Aviation accidents, *Accident investigations, Collision research, Civil aviation, Casualties, Aviation safety, Statistical data, Damage.
Identifiers: DOT/5A, DOT/4DZ/DA.

The publication contains selected aircraft accident reports, in brief format, occurring in U.S. Civil Aviation operations during calendar year 1974. The 896 General Aviation accidents represent a random selection. The publication is issued irregularly, normally six times each year. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by type of accident, phase of operation, kind of flying, injury index, aircraft damage, conditions of light, pilot certificate, injuries, and causal factors.

1C. Aircraft

AD-A011 177/3GA PC$4.25/MF$2.25
Bendix Field Engineering Corp Columbia Md
Avionics Corrosion Control Study.
Final rept. Oct 73-Jan 74.
Jan 74, 55p
Contract N62269-74-C-0168
Report on Aeronautical Analytical Rework Program.

Descriptors: *Avionics, *Corrosion inhibition, Corrosion, Preventive maintenance, Protective treatments, Protective coatings.

The objectives of this report are to offer the Navy a limited study of some of the problems and possible solutions associated with avionics corrosion control that could be the basis of a manual devoted to that subject. The research methods employed sought information from two sources: (1) published material from secondary sources to take advantage of what is already known and documented in the literature, and (2) primary sources derived from activities and experiences within the Bendix Field Engineering Corporation. The conclusion to be drawn is that the essential difference between corrosion problems in large structures and corrosion attacking avionic equipment is that minute corrosion products that could degrade or disable complicated avionic equipment would go unnoticed on large mechanical structures. The results of the investigation correlate positively with previous Bendix work in corrosion phenomena and control.

AD-A011 501/4GA PC$9.50/MF$2.25
Assistant Secretary of Defense (Program Analysis and Evaluation) Washington D C
Acceptance Rates and Tooling Capacity for Selected Military Aircraft.
Oct 74, 330p

Descriptors: *Military aircraft, *Production engineering, *Management planning and control, Production rate, Time, Records, Acceptability, Statistical data, Machine tools, Charts, Attack aircraft, Jet bombers, Transport aircraft, Helicopters, Jet fighters, Supersonic aircraft, Jet training planes, Antisubmarine aircraft, Carrier based aircraft.
Identifiers: Tooling, Production span, Acceptance rates.

This paper presents the detailed data for certain military aircraft used in a study of planned and actual production rates prepared by OASD (Program Analysis and Evaluation) for the Secretary of Defense. The study objective was to determine the degree of optimism in Service planning and its impact on production of aircraft. The conclusions are summarized under the following heads: Initial buildup, maximum production rate, tooling capacity, average production rates, and production span. Eighteen Navy and Air Force aircraft programs were used as the basis for the analysis.

AD-A011 509/7GA PC$6.25/MF$2.25
Rockwell International Corp Los Angeles Calif Los Angeles Aircraft Div
Documentation of Survivability/Vulnerability Related Aircraft Military Specifications and Standards.
Final rept. Sep 73-Jun 74,
W. D. Dotseth, and R. W. Nickel. Apr 75, 175p
JTCG/AS-74-D-003
Contract F33615-73-C-3147

Descriptors: *Military aircraft, *Vulnerability, *Survival(General), *Specifications, Standards, Avionics, Flight control systems, Armor, Power equipment, Fuel systems, Fluidic control, Propulsion system components.

The purpose was to identify military specifications and standards which impact S/V (survivability and vulnerability) of combat aircraft and document the nonnuclear (including high energy lasers) S/V provisions and requirements, noting the deficiencies in these documents. This report contains the results of this study, with specifications and standards listed in alphanumeric order, including identification of S/V provisions and/or deficiencies.

AD-A011 581/6GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Anthropometry and Kinematics in Crew Station Design,
Kenneth W. Kennedy. Jul 73, 17p Rept no. AMRL-TR-72-75

Descriptors: *Cockpits, *Anthropometry, *Safety, Human factors engineering, Kinematics, Pilots, Flight crews.
Identifiers: Design standards.

Attention to the anthropometric and kinematic characteristics of the aircrew member is essential to good cockpit design. The design problems are many in which anthropometric and kinematic variability must be accommodated. Many are crucial to the safety of the pilot and to the success of the mission. The condition of current anthropometric and kinematic data is reviewed.

AD-A011 646/7GA PC$3.75/MF$2.25
Air Force Materials Lab Wright-Patterson AFB Ohio
Joint Aircraft Loading/Structure Response Statistics of Time to Service Crack Initiation.
Technical rept. Jan-Jun 74,
Jann-Nan Yang, and Walter J. Trapp. Nov 74, 48p Rept no. AFML-TR-74-174

Descriptors: *Jet fighters, *Jet training planes, *Aerodynamic loading, *Cracking(Fracturing), Life expectancy, Cracks, Fatigue life, Weibull density functions, Reliability.
Identifiers: *Fracture mechanics.

A reliability analysis for predicting the statistical distribution of time to fatigue crack initiation for aircraft structures in service is presented. The present analysis uses the statistical data of the specimen fatigue tests, the full-scale structure tests, and the statistical dispersion of aircraft service loads. The statistical distribution of the fatigue performance of the full-scale structure under laboratory loading spectrum is assumed to be Weibull. The service loads for gust turbulences are modeled as Poisson processes for transport-type aircraft while the maneuver loads are modeled as compound Poisson processes for fighter and training aircrafts.

AD-A011 654/1GA PC$3.25/MF$2.25
RCA Corp Cape Kennedy Fla
Theoretical Definition of Family IID Balloon Hull Profile,
Terrell H. Yon, Jr. 24 Jan 74, 21p Rept no. RCA/TELTA-TR-74-054
Errata sheet inserted.

Descriptors: *Balloons, *Tethering, *Hulls(Structures), Profiles, Geometry, Coordinates, Configurations.
Identifiers: TELTA(Tethered Lighter Than Air), Tethered lighter than air, HP 9100B calculators.

This technical report contains the original equations defining the theoretical profile of a Family IID hull. In addition, a program using these equations is included for use on a HP 9100B calculator. These equations are fundamental to the evaluation task now in progress under the Design Verification Program.

AD-A011 657/4GA PC$4.25/MF$2.25
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
Aircraft Ground Test Validation of a Variable-Response Landing Gear Concept.
Final rept. Aug 73-Aug 74,
Joseph G. Mercer. Mar 75, 63p Rept no. AFFDL-TR-74-143

Descriptors: *Attack bombers, *Landing gear, *Loads(Forces), Taxiing, Struts, Friction, Wings, Airframes, Stresses, Aircraft landings, Jet bombers.
Identifiers: A-37 B aircraft, A-37 aircraft, Aircraft modification, *Variable response landing gear, Strut friction.

Taxi tests involving an A-37B aircraft were performed at Wichita Municipal Airport, Kansas. The main landing gear was modified to minimize strut friction and to incorporate a softer pneumatic spring. It was found that

elimination of strut friction alone, or elimination of strut friction combined with the use of a softer pneumatic spring could significantly reduce aircraft wing stresses. For the cantilever type strut tested, it was determined that reduction of strut friction should be the primary target in attempting to reduce the transmission of ground loads to the airframe. These tests also verified the ability to test trends in landing gear load transmission characteristics using a landing gear drop tower and a hydraulic vibration machine.

N75-22279/4GA PC$7.00/MF$2.25
Boeing Commercial Airplane Co., Seattle, Wash.
Aerodynamic Design and Analysis System for Supersonic Aircraft. Part 2: User'S Manual.
Final Report.
W. D. Middleton, J. L. Lundry, and R. G. Coleman. Mar 75, 198p NASA-CR-2521, D6-41759-PT-2
Contract NAS1-12052

Descriptors: *Aerodynamic configurations, *Design analysis, *Supersonic aircraft, Aerodynamic coefficients, Computer programs, Friction drag, Manuals, Pressure distribution.

For abstract, see STAR 1314

N75-22301/6GA PC$10.25/MF$2.25
Douglas Aircraft Co., Inc., Santa Monica, Calif.
Analysis of Operational Requirements for Medium Density Air Transportation, Volume 2.
Final Report.
Mar 75, 388p NASA-CR-137604, MDC-J4484-VOL-2
Contract NAS2-8135

Descriptors: *Air transportation, *Aircraft design, *Commercial aircraft, *Short takeoff aircraft, Economic factors, General aviation aircraft, Market research.

For abstract, see STAR 1314

N75-22302/4GA PC$8.75/MF$2.25
Douglas Aircraft Co., Inc., Santa Monica, Calif.
Analysis of Operational Requirements for Medium Density Air Transportation. Volume 3: Appendix.
Mar 75, 277p NASA-CR-137605, MDC-J4484-VOL-3
Contract NAS2-8135

Descriptors: *Air transportation, *Aircraft design, *Commercial aircraft, *Short takeoff aircraft, Economic factors, General aviation aircraft, Market research.

For abstract, see STAR 1314

N75-22314/9GA PC$5.75/MF$2.25
McDonnell-Douglas Corp., Long Beach, Calif.
Boron/Aluminum Skins for the DC-10 Aft Pylon.
Final Report, 28 Feb. - 31 Oct. 1974.
S. Y. Elliott. May 75, 150p NASA-CR-132645
Contract NAS1-13029

Descriptors: *Aircraft design, *Dc 10 aircraft, *Pylons, *Skin (Structural member), Aircraft structures, Aluminum alloys, Boron alloys, Design analysis.

For abstract, see STAR 1314

N75-22326/3GA PC$4.75/MF$2.25
Advisory Group for Aerospace Research and Development, Paris (France).
Secondary Power Systems for Advanced Rotorcraft.
R. G. Smith. Feb 75, 94p AGARD-AG-206, AGARDOGRAPH-206

Descriptors: *Auxiliary power sources, *International cooperation, *Power efficiency, *Rotorcraft aircraft, *Systems analysis, Auxiliary power sources, Cost analysis, Environmental engineering, Helicopter design, Ice prevention, North atlantic treaty organization (Nato), Quality control.

For abstract, see STAR 1314

N75-22334/7GA PC$6.25/MF$2.25
General Electric Co., Pittsfield, Mass. Environmental Electromagnetics Unit.
Lightning Effects on the NASA F-8 Digital-Fly-by-Wire Airplane.
Final Report.
J. A. Plumer, F. A. Fisher, and L. C. Walko. Mar 75, 154p NASA-CR-2524, SRD-26-06
Contract NAS4-2090

Descriptors: *Electric current, *F-8 aircraft, *Fly by wire control, *Lightning, *Transient response, Computerized simulation, Electrical measurement, Electrical properties, Systems analysis.

For abstract, see STAR 1314

N75-22487/3GA PC$7.50/MF$2.25
Advisory Group for Aerospace Research and Development, Paris (France).
Specialists Meeting on Fretting in Aircraft Systems.
Jan 75, 229p AGARD-CP-161
Conf-Presented at 39TH Meeting of the Struct. And Mater. Panel, Munich, 6-12 Oct. 1974.
In English; Partly in French.

Descriptors: *Aircraft structures, *Fatigue (Materials), *Fretting, *Metal fatigue, *Structural failure, Control surfaces, Failure analysis, Friction reduction, Service life, Turbine engines.

For abstract, see STAR 1314

N75-22562/3GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Operation Control System for Aircraft.
K. Busch, and H. Bruemmer. May 75, 22p NASA-TT-F-16362
Contract NASW-2483
Tran-Transl. Into English from German Patent Auslegeschrift No. 1623888, German Class 42D 1/12; International Class Gold, 5/39; Reference P1623888.3-52 (34694), 25 Oct. 1967 9 p.

Descriptors: *Aircraft control, *Operating systems (Computers), Analog to digital converters, Circuits, Display devices.

For abstract, see STAR 1314

PATENT-3 879 916 Not available NTIS
Department of the Air Force Washington D C
Fatigue Resistant Spanwise Splice.
Patent,
Carroll R. Bigham. Filed 22 Jul 74, patented 29 Apr 75, 4p Rept nos. PAT-APPL-490 599, Supersedes AD-D000 300.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Airplane panels, *Fastenings, *Patents, Structural members, Joining, Loads(Forces), Fatigue(Mechanics).
Identifiers: PAT-CL-52-758-D, *Splicing, *Splices, *Splice plates.

The patent relates to a method and apparatus for joining a pair of wing panels or the like by a spanwise splice. The splice is made up of a pair of splice plates, each being of a predetermined configuration so as to engagingly mate with a corresponding configuration on the panels. The panels are so positioned so that their ends are juxtaposed leaving a gap therebetween. A suitable fastener is located within the gap and fixedly secures the splice plates together thereby forming an extremely strong and reliable means of securely attaching a pair of members together.

PB-241 904/2GA PC$7.25/MF$2.25
Environmental Protection Agency, Washington, D.C. Office of Research and Development.
Federal Aircraft Noise Research, Development, and Demonstration Programs: FY 73 - FY 75.
Final rept.
Mar 75, 201p EPA/600/2-75-003

Descriptors: *Aircraft noise, *Research management, Noise(Sound), Acoustic measurement, Acoustic environments, Noise reduction, Jet aircraft noise, Jet engine noise, Noise standards, Federal budgets.
Identifiers: *Noise levels.

The Interagency Aircraft Noise Research Panel was established by the Environmental Protection Agency to aid EPA in fulfilling its responsibility for coordinating the Federal noise research activities. This report is the first prepared by the Panel and provides an inventory of current and planned Federal aircraft noise RD&D programs. The Federal agencies which sponsor aircraft noise RD&D are the National Aeronautic and Space Administration, the Department of Transportation, the Department of Defense, the National Science Foundation, and the EPA. The report is organized by technical areas with each agency's programs presented under the appropriate technical area. Emphasis is on fiscal years 1974 and 1975, but summary information on fiscal years 1973 and 1976 is also included. The Appendix contains detailed programmatic information as furnished by the Federal agencies on their aircraft related RD&D activities.

PB-242 583/3GA PC$4.75/MF$2.25
Informatics, Inc., Rockville, Md.
Information on FAA Certification of Aircraft,
Carl Modig. Jan 75, 84p EPA/550/9-75-022
Contract EPA-68-01-3115

Descriptors: *Aircraft noise, *Federal policies, *Regulations, Noise pollution, Turboprop engines, Jet aircraft noise, Transport aircraft, Classifications, Information, National government.
Identifiers: *Certification.

This study provides an overview of FAA aircraft type certification regulations and the regulatory process through which aviation noise regulations are or could be implemented. Special reference is made to the regulatory process most relevent to transport category and/or turbine powered aircraft. The various types of certificates are covered. Tabular data for various types and models certificated since 1969 are presented as well as types or models complying with the noise limits in Appendix C of FAR 36.

1E. Air Facilities

AD-A011 447/0GA PC$3.25/MF$2.25
Sanders and Thomas Inc Pottstown Pa
Aircraft Design Reference Data for Expeditionary Airfields.
Final rept.
27 Sep 74, 25p NAEC-ENG-7856

Descriptors: *Landing fields, *Tactical aircraft, Assembly, Transportation, Jet aircraft, Naval operations, Launching, Catapults, Arresting gear, Landing aids, Glide slope.
Identifiers: *Expeditionary airfields, Design.

A description of expeditionary airfields and associated components is presented to familiarize aircraft designers with the expeditionary aircraft concept. An expeditionary airfield is a complete airfield that can be transported and assembled easily and have the capability to launch, recover and support certain high performance tactical jet aircraft. The report provides necessary design parameters to insure that future aircraft have expeditionary airfield operating capability.

AD-A011 488/4GA PC$8.75/MF$2.25
Howard Needles Tammen and Bergendoff Alexandria Va
Field Survey and Analysis of Aircraft Distribution on Airport Pavements.
Final rept.,
Victor A. HoSang. Feb 75, 280p FAA-RD-74-36
Contract DOT-FA71WAI-218
Prepared in cooperation with Army Engineer Waterways Experiment Station, Vicksburg, Miss. See also report dated Jul 73, AD-765 435.

Descriptors: *Pavements, *Deformation, *Airports, Civil aviation, Commercial aircraft, Jet transport planes, Runways, Taxiways, Wheels, Loads(Forces), Strain(Mechanics), Traffic, Takeoff, Aircraft landings.
Identifiers: Design criteria, DOT/4CZ/CA, DOT/4CZ/CY.

Data for the current, most-commonly-used air carrier aircraft were collected and analyzed at nine major civil airports. Observations of lateral wheel-path distributions on runways, runway exits, and taxiways; operating ground speeds on runways and taxiways; and the general areas of aircraft touchdown and rotation on runways were recorded. Statistical analysis of the data indicates that the actual lateral distributions of aircraft wheel-paths on runways and taxiways are more accurately represented by theoretical normal distribution functions, compared with the uniform distribution assumed in the current p/c relationship. The mean and standard deviations of the observed distributions were calculated and are presented by aircraft type. These mean and standard deviation values may be used as the basis for selecting representative normal distribution functions for use in developing more realistic p/c relationships, for either individual or groupings of aircraft types.

AD-A011 540/2GA PC$4.25/MF$2.25
Burns and Mcdonnell Kansas City Mo
Analysis of General Aviation Airports Developed with and without Federal Financial Assistance. Task 1.
Summary rept.
Aug 74, 62p Rept no. 74-056-4-001
Contract DOT-FA74WA-3434
See also AD-A011 543 and Task 2, AD-A011 541.

Descriptors: *Airports, *Civil aviation, Surveys, Comparison, Management planning and control, Questionnaires, Standards, Data acquisition, Sites, Pavements, Markers, Lighting equipment, Assessment, Flow charting, State government.
Identifiers: Dimensions, DOT/2A, DOT/4CZ/CY, Private financing programs, Federal assistance programs, State programs, *General aviation airports, National government.

The report covers the first of three tasks designed to furnish comparative data on federal and state programs for developing airports. The purpose of the initial effort is to assemble published data on the planning, design, construction, and financing of airports serving small general aviation aircraft; to develop criteria for making comparisons; to identify standards that may provide significant evaluation information; and to identify pairs of airports for physical evaluation.

AD-A011 541/0GA PC$9.25/MF$2.25
Burns and Mcdonnell Kansas City Mo
Analysis of General Aviation Airports Developed with and without Federal Financial Assistance. Task II. Comparatives Analysis of Selected General Aviation Airports.
Summary rept.
Feb 75, 319p Rept no. 74-056-4-002-Task-2
Contract DOT-FA74WA-3434
See also Task 1, AD-A011 540 and Task 3, AD-A011 542.

Descriptors: *Airports, *Civil aviation, Surveys, Comparison, Selection, Standards, Interviewing, Inspection, Management, Lighting equipment, Navigational aids, Assessment, United States, State government.
Identifiers: DOT/2A, DOT/4CZ/CY, Private financing programs, Federal assistance programs, State programs, *General aviation airports, National government.

The report covers the second phase of a three part task. Its purpose is to make a comparative analysis of selected general aviation airports in the United States. Airports chosen are in a number of states, representing either federal or state development programs, and are evaluated to determine the differences inherent in the various programs.

AD-A011 542/8GA PC$4.25/MF$2.25
Burns and Mcdonnell Kansas City Mo
Analysis of General Aviation Airports Developed with and without Federal Financial Assistance. Task III. Evaluation of Federal Standards and Program Procedures.
Summary rept.
May 75, 73p Rept no. 74-056-4-002-Task-3
Contract DOT-FA74WA-3434
See also Task 2, AD-A011 541.

Descriptors: *Airports, *Civil aviation, Assessment, Effectiveness, Standards, Requirements, Surveys, Information systems, Management, Finance, State government.
Identifiers: Federal financing programs, DOT/2A, DOT/4CZ/CY, Private financing programs, Federal assistance programs, State programs, Program review, *General aviation airports, National government.

Task 3 of a three-part analysis involves a detailed evaluation of the standards and requirements of the Federal Aviation Administration. The object is to identify major factors in the federal program which relates to general aviation airports that refer to effectiveness. The findings are expected to indicate possible modifications or changes to improve the program, and to point out the standards now existing which are indeed effective.

AD-A011 543/6GA PC$3.25/MF$2.25
Burns and Mcdonnell Kansas City Mo
Analysis of General Aviation Airports Developed with and without Federal Financial Assistance.
Final rept.
May 75, 25p Rept no. 74-056-4-002-FR
Contract DOT-FA74WA-3434
See also Task 1. AD-A011 540.

Descriptors: *Airports, *Civil aviation, Surveys, Comparison, Research management, Sites, Standards, Management planning and control, Data acquisition, Factor analysis, Finance, Information systems, State government.
Identifiers: DOT/2A, DOT/4CZ/CY, Private financing programs, Federal assistance programs, State programs, Evaluation, *General aviation airports, National government.

The report summarizes three separate tasks involved in an analysis of United States general aviation airports. The analysis is intended to provide information concerning the effectiveness of federal airport aid programs as compared to similar programs of state aviation agencies. The principal aim is to identify differences and to study the impact of those differences on program effectiveness. The results may be useful in determining modifications which would be helpful.

AD-A011 589/9GA PC$4.75/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
The Status of Development of a Maintenance Management System for Airfield Pavements.
Final rept. Jul 71-Jun 74,
P. F. McManus. May 75, 76p AFWL-TR-74-154
Contract F29601-71-X-0002

Descriptors: *Pavements, *Runways, *Preventive maintenance, Management, Failure(Mechanics), Cost effectiveness, Scheduling, Performance(Engineering), Detection, Computer programming, Military facilities, Civil engineering.
Identifiers: PREDICT Computer program, PAVER computer program, Pavement distress.

The objective of the project is to develop methodology for determining cost-effective plans for preventive maintenance of airfield pavements so that functional requirements are met with a minimum of major repair and reconstruction effort. The approach for meeting these objectives is to create a computerized Maintenance Management System which will predict maintenance requirements, analyze alternative schedules of maintenance activities and determine cost-effective schedules, monitor actual pavement performance, and provide reports on the performance and cost of pavement facilities to all levels of command. At present, two computer codes are available, PREDICT And PAVER, which have been developed for this project and concurrent projects sponsored by the U.S. Army Corps of Engineers. These programs are recommended for use in test implementations at Air Force bases.

2. AGRICULTURE

2C. Agricultural Engineering

PAT-APPL-476 191/GA PC$3.75/MF$2.25
Department of Agriculture, Washington, D.C.
Air Jet Nozzle Assembly for a Green Boll Separating and/or Classifying Machine.
Patent Application,
Joseph W. Laird. Filed 4 Jun 74, 30p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Separators, *Cottonseed, *Cotton plants, *Patent applications, Nozzles, Air flow, Density(Mass/volume), Compressed air, Agricultural machinery.

The patent application relates to an improvement in a new type of machine used to separate and/or classify materials on the basis of different density and/or aerodynamic transportation properties. A particular application for which this machine was developed is to compliment a green boll separator and improve the efficiency of the removal of green bolls from seed cotton.

PAT-APPL-476 235/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Removal of Green Bolls and Heavy Materials from Seed Cotton by Air Jets.
Patent Application,
Joseph W. Laird, and Roy V. Baker. Filed 4 Jun 74, 24p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Separators, *Jets, *Cotton plants, *Patent applications, Classifications, Air flow,

Density(Mass/volume), Agricultural machinery, Conveyors.

The patent application relates to a new type of machine for separation or classification of materials on the basis of different density and/or aerodynamic transportation properties. A particular application for which this machine was developed is the separation of green bolls and other foreign material from dry open cotton.

PAT-APPL-476 240/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Air Jet Conveyor Accelerator for a Green Boll Separating and Classifying Machine.
Patent Application,
Roy V. Baker, and Joseph W. Laird. Filed 4 Jun 74, 18p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Separators, *Jets, *Cotton plants, *Patent applications, Classifications, Air flow, Density(Mass/volume), Agricultural machinery, Conveyors.

The patent application relates to an improvement in a new type of machine used to separate and/or classify materials on the basis of different density and/or aerodynamic transportation properties. A particular application for which this invention was developed is to compliment a green boll separator. In the development of the green boll separator, it was found that seed cotton would not become airborne when dropped directly on the air pipes of the separator. It was necessary to accelerate the cotton to a linear velocity approaching that of the conveying stream before feeding the cotton onto the air pipes.

PAT-APPL-506 932/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Apparatus and System for Mixing Pesticide with Water Concurrently with Spraying.
Patent Application,
Edsel A. Harrell, Woodrow W. Hare, and John R. Young. Filed 17 Sep 74, 13p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Sprayers, *Mixers, *Patent applications, Pesticides, Agricultural machinery, Spray nozzles, Circulation, Pressure regulators.

The patent application describes a new apparatus and system for mixing pesticides with water concurrently with spraying. Pesticide and water are metered into a mixing reservoir in a continuous process. The mixed solution is transferred by means of a pump to a pressure regulator and then dispensed through a set of nozzles onto rows of plants. The mixing action of the pesticide is attained in the mixing reservoir by recycle of a percentage of the pesticide solution from the pressure regulator. Concentrations of pesticide are set by empirical tests and balanced between the dry pesticide metering device which is an auger and the recycle solution.

PAT-APPL-525 129/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Fluid Impact Gin.
Patent Application,
Anselm C. Griffin, Jr., and Harold Watson. Filed 19 Nov 74, 6p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Separators, *Cotton fibers, *Cottonseed, *Patent applications, Spray nozzles, Pressure, Agricultural machinery, Conveyors.

The patent application describes a new apparatus and system for separating cotton fibers from their seeds using the energy of an impacting fluid as the separating force. Cotton fibers are wetted and embedded on a toothed surface rotating cylinder. As the cylinder is rotated, a system of spray nozzles are directed tangentially at the cylinder. Fluid is sprayed under pressure against the cottonseed and thus causes separation of the seeds from the cotton. The cottonseeds and cotton fibers are separately conveyed away for further processing.

PB-242 328/3GA PC$5.25/MF$2.25
Arkansas Univ., Fayetteville. Water Resources Research Center.
Heat and Moisture Conduction in Unsaturated Soils.
Completion rept.,
J. A. Havens, and R. E. Babcock. Jun 74, 117p
Pub-25 W75-08477, OWRT-A-014-ARK(2)
Contract DI-14-31-0001-3804

Descriptors: *Soils, *Heat recovery, *Cooling water, Pipelines, Soil water, Nuclear power plants, Thermodynamics, Mathematical models, Thermal conductivity, Heat transfer.
Identifiers: *Soil heating, *Waste heat utilization.

Mathematical models are developed for the prediction of heat transfer from hot water pipes buried in the soil. Heat transfer in the absence of moisture transfer is described as a function of the difference between the temperature of the pipe and the temperature of the soil surface. The energy balance is used to determine the longitudinal temperature distribution of the water. The method is extended to describe a system of equally spaced, parallel buried pipes. Soil temperature profiles around the pipes are presented. The model is used to calculate the land area that can be heated by an underground piping system carrying cooling water from the condensers of a 1000 MW nuclear-electric plant.

PB-242 338/2GA PC$4.75/MF$2.25
Wisconsin Univ., Madison. Dept. of Mechanical Engineering.
Mechanical Harvesting of Aquatic Vegetation: Development of a High Speed Pickup Unit.
Master's thesis,
Harold Francis Link. 1974, 89p W75-08471, OWRT-B-018-WIS(3)
Contract DI-14-01-0001-1957, Grant NSF-GI-39193

Descriptors: *Aquatic plants, *Harvesting, *Agricultural machinery, Aquatic weeds, Design, Conveyors, Dewatering, Cutting, Disposal, Test methods, Performance, Cost estimates, Weed control, Wisconsin, Theses.

The unit described gathers and picks up cut vegetation floating on the water surface. The gathering system consists of two horizontal arms approximately one foot above the water arranged in a 'V' configuration with the open end forward and the vertex just ahead of the barge onto which they are mounted. Steel tines attached at approximately five inch intervals to chains, extend vertically into the water, travel rearwards along the bottom of the arm to the vertex of the 'V' and then return forward along the top. If the forward velocity of the barge and the rearward component of tooth velocity are matched, the floating vegetation contacted by the teeth is concentrated sideways into a windrow, passes through a gap at the vertex of the 'V' and is elevated onto the barge by a slatted conveyor, the bottom end of which extends just below the water surface. Tests were run using various forward velocities and angles between the arms. Power requirements were measured and collection performance was evaluated.

PB-242 343/2GA PC$5.25/MF$2.25
Idaho Univ., Moscow. Dept. of Agricultural Economics.
An Economic Analysis of Changes in Irrigation Practices in Jefferson County, Idaho.
Master's thesis,
John E. Milliner. Aug 74, 111p W75-08481, OWRT-B-033-IDA(2)

Descriptors: *Irrigation, *Economic analysis, *Water supply, Water table, Cost analysis, Farms, Linear programming, Mathematical models, Income, Feasibility, Sprinkler irrigation, Budgeting, Idaho, Theses.
Identifiers: Jefferson County(Idaho), Water utilization.

Economic effects of solving a high water table problem in southeastern Idaho near Rigby were analyzed. The objectives were to analyze the farm situation the farm level. Two methods were used: one involved a theoretical decrease of water availability without alterations to the present farm irrigation system while the second involved a water decrease by incorporating sprinkler systems to the area. Budgets were developed for hand-moved, wheel-moved and a center-pivot sprinkler system; costs were then deducted from the linear programming solution and analyzed.

PB-242 345/7GA PC$4.75/MF$2.25
Idaho Univ., Moscow. Dept. of Civil Engineering.
Analysis and Design of Settling Basins for Irrigation Return Flow.
Master's thesis,
Floyd Leon Ballard. Jan 75, 77p W75-08484, OWRT-A-042-IDA(2)

Descriptors: *Settling basins, *Irrigation, Sediments, Removal, Regression analysis, Ponds, Design criteria, Erosion, Phosphates, Nitrogen, Mathematical models, Theses.
Identifiers: *Return flow.

Nine fields under furrow irrigation were studied to determine sediment yield to ponds as a function of crop type, soil type and topography. Data were collected from seven farm settling ponds located on these fields to gain insight into the factors which affect pond removal efficiency. To determine design criteria for on-farm settling ponds, regression analysis was used to develop predictive equations for sediment yield. Independent variables included flow onto field, slope, furrow length, time of run, and the irrigated area. During an irrigated season 0.339 to 37.00 tons of sediment per acre were eroded. A mathematical model was a useful tool for pond design; efficiencies ranged from 43.0%-100% for sediment and 28.6%-77.7% for phosphate and nitrogen.

PB-242 545/2GA PC$10.00/MF$2.25
East Central State Coll., Ada, Okla. School of Environmental Science.
Livestock and the Environment. A Bibliography with Abstracts.
Environmental protection technology series,
Ralph H. Ramsey. Apr 74, 364p* EPA/660/2-74/024
Grant EPA-R-801-454
Paper copy also available from GPO.

Descriptors: *Agricultural wastes, *Industrial waste treatment, *Water pollution control, *Livestock, *Bibliographies, Beef cattle, Swine, Poultry, Sheep, Dairy cattle, Waste disposal, Surface water runoff, Byproducts, Air pollution, Fertilizers, Odor control, Hog houses, Indexes(Documentation).
Identifiers: Feedlot wastes, Manure.

Livestock waste management research literature has expanded rapidly. The bibliography makes sources of information on this research available to the researcher, designer, regulatory

official and others interested in the latest developments in animal waste handling, treatment, disposal or reuse. Included in the bibliography are references which include title, author, keywords, and source data.

2D. Agronomy and Horticulture

JPRS-64909 PC$5.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Buckwheat: Its Cultivation, Agrotechnology and Protection,
I. N. Elagin. 4 Jun 75, 113p
Trans. of mono. Vozdelyvanie Grechikhi, Moscow, 1967 p5-6, 31-142, 169-176.

Descriptors: *Grain crops, *Cultivation, Plant growth, Climate, Soils, Photoperiodism, Fertilizers, Plant diseases, Agronomy, Translations, USSR.
Identifiers: Buckwheat plants.

The report contains a description of the cultivation, agrotechnology and protection of buckwheat crops.

N75-22891/6GA PC$3.75/MF$2.25
Clemson Univ., S.C. Dept. of Horticulture.
Crop Status Evaluations and Yield Predictions.
Annual Summary Report, 1 Apr. 1974 - 31 Mar. 1975.
J. R. Haun. 24 Mar 75, 41p NASA-CR-141786
Contract NAS9-14006

Descriptors: *Agriculture, *Crop growth, *Environment effects, *Heat, Climate, Earth resources, Prediction analysis techniques.

For abstract, see STAR 1314

PATENT-3 849 104 Not available NTIS
Department of Agriculture, Washington, D.C.
Control of Aeschynomene SP. with Colletrotrichum Gloeosporioides Penz. F. SP. Aeschynomene.
Patent,
James T. Daniel, George E. Templeton, and Roy J. Smith, Jr. Filed 17 Apr 73, patented 19 Nov 74, 4p PAT-APPL-351 934,
Supersedes PB-230 407.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Weed control, *Fungus diseases, Fungi, Plant pathology, Plant diseases, Rice, Plants(Botany).
Identifiers: PAT-CL-424-093-000, *Biological weed control, Biological pest control, *Joint vetch, Aeschynomene virginica, Colletotrichum gloeosporioides.

This invention relates to a method for controlling northern jointvetch. More particularly, this invention relates to a method for controlling northern jointvetch with an endemic anthracnose disease of northern jointvetch (Aeschynomene virginica (1) B.S.P.) incited by the fungus Colletotrichum gloesporiodes Penz. form specialis aeschynomene, American Type Culture Number 20358.

2E. Animal Husbandry

PAT-APPL-519 727/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Pollen Trap with Cleaning Grid.
Patent Application,
Norbert M. Kauffeld. Filed 31 Oct 74, 13p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Traps, *Pollen, *Patent applications, Bees, Sizing screens, Wire cloth, Removal, Feeding stuffs, Animal husbandry.

The patent application describes a pollen collecting and trash removal apparatus for use on honey bee colonies in which bees entering from the field with pollen are forced to twist their bodies through a double screen grid with offset squares and lose the pollen pellets. These fall through a hardware cloth into a pollen drawer. Bees leaving the hive with trash are forced to drop it, when they have to crawl through a 2 screen grid without offset squares, and through a 1/2 inch hardware cloth into the trash drawer.

TT-74-53315 PC$3.75/MF$2.25
Agricultural Research Service, Washington, D.C.
Survival of Demodex Bovis Away from the Host (Vyzhivaemost Kleshei Demodex Bovis v Razlichnikh Usloviyak b Neshkie Sredy),
L. Kh. Azamatov. 1975, 8p
Trans. of Vsesoyuznyi Nauchno-Issledovatelskii Institut Veterinarnoi Sanitarii, Moscow. Trudy (USSR) v34 p397-400 1969. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Mites, *Cattle, *Parasites, Stability, Decontamination, Veterinary medicine, Survival, Temperature, USSR, Translations, Insects.
Identifiers: Demodex bovis, Ectoparasites.

Ticks of D.bovis survive: in tap water at 15-18C from 6 hrs to 9 days, at 37C - from 1 hr to 2 days, at 5-8C - from 1 hr to 5 days; in urine at 15-18C - from 1 hr to 1.5 days, at 5-8C - from 1 hr to 1 day; in liquid dung - from 1 hr to 2 days; in stacked manure - from 1 hr to 1 day. Ticks of D.bovis show active movement at 35-40C; moderate movement at 25-30C, slow movement at 15-20C and become immobile below 14-15C.

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

N75-23422/9GA PC$4.75/MF$2.25
European Southern Observatory, Hamburg (West Germany).
Research Activities of the European Southern Observatory.
Annual Report, 1973.
1974, 90p

Descriptors: *Astronomical observatories, *Astronomical telescopes, *Chile, *Europe, Astronomical maps, Buildings, Libraries, Meteorology.

For abstract, see STAR 1314

3B. Astrophysics

AD-A011 146/8GA PC$3.25/MF$2.25
Owens Valley Radio Observatory Pasadena Calif
The Galactic Distribution of Molecules (A CO Survey)(6),
N. Z. Scoville. 1975, 18p Rept no. 1975-6
Contract N00014-67-A-0094-0019

Descriptors: *Carbon monoxide, *Interstellar matter, Galaxies, Spectral lines, Extraterrestrial radio waves, Density, Clouds, Molecules.
Identifiers: *Astronomical spectroscopy.

The J = 1 to 0 emission of CO has been surveyed in the galactic plane between l = -10 and +90 degrees with a 1' beam sampling every degree. Molecular clouds emitting in the CO line are plentiful over the inner region of the galaxy. Their greatest number occurs in the galactic nucleus and at a radius of 5.5 kpc - a distribution similar to radio H II regions but very different from that previously derived for atomic hydrogen. The total mass in molecular clouds is found, and each typically has an average density of 500/cc, and a temperature of 7 K. These results suggest that most of the interstellar medium in the interior of the galaxy is molecular H2.

AD-A011 147/6GA PC$3.25/MF$2.25
Owens Valley Radio Observatory Pasadena Calif
Evidence for Zeeman Splitting in 1720 MHz OH Line Emission (9),
K. Y. Lo, R. C. Walker, M. S. Ewing, J. M. Moran, and K. J. Johnson. 1975, 24p Rept no. 1975-9
Contract N00014-67-A-0094-0019

Descriptors: *Extraterrestrial radio waves, *Zeeman effect, *Hydroxyl radicals, Spectrum analysis, Emission spectra, Masers.
Identifiers: *Astronomical spectroscopy, Microwave spectra.

A number of 1720-MHz OH maser sources have relatively simple spectra consisting of doublets with opposite senses of circular polarization. Such doublets could be due to the Zeeman splitting of the doublet Pi(3/2)F = 2 to 1 transition. A 3-station VLBI experiment was conducted to measure the spatial separation of the emitting regions of the components of opposite sense polarization. The doublets in the 1720-MHz OH spectra of W3(OH), W51, NGC6334(N) and NGC7538(N) are found to be spatially coincident to within a linear dimension of about 100 Au, suggesting that they originate from the same region in space. This is taken to be strong evidence for identifying the doublets as Zeeman components. The magnetic field within the OH maser sources responsible for the observed splitting is typically a few times .001 gauss.

AD-A011 148/4GA PC$3.75/MF$2.25
Owens Valley Radio Observatory Pasadena Calif
The Molecular Cloud Sgr B2 (10),
N. Z. Scoville, P. M. Solomon, and A. A. Penzias. 1975, 35p Rept no. 1975-10
Contract N00014-67-A-0094-0019

Descriptors: *Interstellar matter, *Radio sources(Astronomy), Gas dynamics, Clouds, Spectral lines, Carbon monoxide, Formaldehyde, Carbon monosulfide, Extraterrestrial radio waves, Temperature, Molecules.
Identifiers: *Astronomical spectroscopy.

The structure of the Sgr B2 molecular cloud has been studied by detailed and extensive mappings of the CO, (13C)O, CS and H2CO (20cm) transitions. The cloud consists of a dense core at the OH maser position plus a very large (r = 45 pc) envelope. The total mass of the cloud is estimated independently from calculated (13C)O column densities, from application of the virial theorem, and from far infrared measurements. The molecular gas has an average temperature of about 20K; that this is similar to the temperature of grains emitting far infrared radiation is taken as evidence of near thermal equilibrium between dust grains and H2. The dynamics of the gas in the cloud are found to be dominated by large scale systematic motions with velocity not a monotonic function of radius.

AD-A011 149/2GA PC$3.25/MF$2.25
Owens Valley Radio Observatory Pasadena Calif
The 18CM Visibility Functions of High Frequency Compact Sources, (11),
David B. Shaffer, and Richard T. Schilizzi. 1975, 22p Rept no. 1975-11

Contract N00014-67-A-0094-0019, Grant NSF-GP-30400
Sponsored in part by Grant NSF-GP-19400.

Descriptors: *Radio sources(Astronomy), Brightness, Flux density, Galaxies.
Identifiers: Cygnus X-3 radio source, Seyfert galaxies, Centaurus A galaxy.

Observations at 18 cm, with an angular resolution of approximately 0.01 sec., of the strongest compact radio sources with milliarcsecond structure at shorter wavelengths (6-2 cm) show that most of the sources are only slightly resolved, and most of the 18 cm radiation comes from quite small components, probably the same components seen at the short wavelengths. Some sources have brightness temperatures > 10 to the 12th power K. Weak emissions were detected from the nucleus of Centaurus A. The May, 1974 radio outburst of Cyg X-3 appears to have had an expansion velocity of about 0.2 c.

AD-A011 600/4GA PC$3.75/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
New Views of Sunspots.
Environmental research papers,
Jacques M. Beckers. 10 Feb 75, 30p Rept nos. AFCRL-ERP-499, AFCRL-TR-75-0089

Descriptors: *Sunspots, *Solar activity, Temperature gradients, Oscillation, Magnetic properties, Emission, Emissivity, Magnetohydrodynamics, Magnetohydrodynamic waves, Photosphere, Chromosphere.
Identifiers: Umbra, Alfven waves.

The report reviews recent theoretical and observational developments in sunspot physics. It concentrates especially on the recent discoveries of rapid changes in sunspots, most of them oscillatory, and their connection with Alfven waves generated in spots.

AD-A011 672/3GA PC$3.25/MF$2.25
Oslo Univ (Norway) Inst of Theoretical Astrophysics
The K and H Ca II Line Emission Ratio in Prominences.
Journal reprint,
Bjorn M. Rustad. 1975, 20p AFCRL-TR-75-0321
Grant AF-AFOSR-2294-72

Descriptors: *Solar activity, Chromosphere, Solar spectrum, Calcium, Potassium, Hydrogen, Solar radiation, Intensity, Emission spectra, Tables(Data).
Identifiers: *Solar prominences.

The K and H CaII line emission ratios are studied in a number of prominences observed with the solar tower telescope of Oslo Solar Observatory from August 11, 1972, through June 18, 1974. Eighty-seven prominence spectra from 36 prominences are divided into three groups according to the degree of activity. No significant differences are detected in the averaged line ratios for the three groups. The average line emission ratio is 1.28.

N75-22343/8GA PC$5.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Real Time Solar Magnetograph Skylab Mission Atlas.
M. J. Hagyard, and N. P. Cumings. Mar 75, 106p NASA-TM-X-64922

Descriptors: *Magnetic measurement, *Magnetometers, *Skylab program, *Solar magnetic field, Digital data, Graphs (Charts), Photographs, Tables (Data).

For abstract, see STAR 1314

N75-22985/6GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Ionospheric and Cosmic Ray Observations Observations Ionospheriques et du Rayonnement Cosmique Bulletin Mensuel, Juillet 1974.
Monthly Bulletin, Jul. 1974.
Jul 74, 31p
In French and Dutch.

Descriptors: *Cosmic rays, *Ionospheric sounding, *Neutron flux density, *Tables (Data), Belgium, E region, F region, Maximum usable frequency.

For abstract, see STAR 1314

N75-23393/2GA PC$7.00/MF$2.25
Arbeitsgemeinschaft fuer Weltraumforschung, Munich (West Germany).
Helios Satellite Scientific Data Evaluation Projekt Helios - Symposium Zur Vorbereitung der Wissenschaftlichen Datenauswertung.
H. Porsche. Oct 74, 200p BMFT-FB-W-74-08
Subm-Sponsored by Bundesmin. Fuer Forsch. U. Technol. Conf-Proc. Of a Symp. Held at Windberg, West Ger., 6-8 Feb. 1974.
Partly in German; Partly in English.

Descriptors: *Conferences, *Data processing, *Helios project, *Preflight analysis, Data reduction, Faraday effect, Gravitation theory, Interplanetary dust, Satellite-borne instruments, Solar corona, Solar wind, Solar x-rays.

For abstract, see STAR 1314

N75-23420/3GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Small Astronomy Payloads for Spacelab.
R. C. Bohlin. 1975, 98p NASA-TM-X-70882, X-692-75-91
Subm-Submitted for Publication. Conf-Workshop Held at Greenbelt, MD., 13-14 Feb. 1975.

Descriptors: *Conferences, *Payloads, *Space laboratories, *Space shuttles, Cost effectiveness, Infrared radiation, Space shuttle orbiters, Spaceborne astronomy, Ultraviolet radiation.

For abstract, see STAR 1314

N75-23421/1GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Sas-2 High Energy gamma-Ray Observations of the Vela Pulsar.
D. J. Thompson, C. E. Fichtel, D. A. Kniffen, and H. B. Oegelman. Apr 75, 14p NASA-TM-X-70877, X-662-75-102
Subm-Submitted for Publication.

Descriptors: *Gamma rays, *Pulsars, *Small astronomy satellites, Extremum values, Luminous intensity, Radiation, Radio emission, Radio telescopes, Supernova remnants.

For abstract, see STAR 1314

N75-23431/0GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Sudden Day Length Variations in January 1974.
M. Feissel, and B. Quinot. May 75, 6p NASA-TT-F-16363
Contract NASW-2481
Tran-Transl. Into English from Compt. Rend., Ser. B-Sci. Physiques, (Paris), V. 278, 1974 p 293-294.

Descriptors: *Daytime, *Length, *Reduction, Periodic variations, Space probes.

For abstract, see STAR 1314

N75-23440/1GA PC$3.75/MF$2.25
California Inst. of Tech., Pasadena. Div. of Geological and Planetary Sciences.
Measurement of the Lunar Neutron Density Profile.
D. S. Woolum, D. S. Burnett, M. Furst, and J. R. Weiss. 1974, 45p NASA-CR-141782, CONTRIB-2539
Contract NAS9-12585, Grant NSG-07023

Descriptors: *Apollo 17 flight, *Lunar surface, *Neutron distribution, Boron isotopes, Cadmium isotopes, Capture effect, Gadolinium isotopes, Lithium isotopes, Particle tracks, Samarium isotopes.

For abstract, see STAR 1314

N75-23441/9GA PC$3.75/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Processing of the Results of the Radar Measurements of the MARS from the Earth in 1971, Applicable to the Problems of Radar Altimetry.
N. N. Krupenio, and V. A. Ladygin. May 75, 39p NASA-TT-F-16294
Contract NASW-2481
Tran-Transl, into English from the Mono. "Obrabotka Rezul'Tatov Radiolakatsionnykh Izmereniy Marsa S Zemli V 1971 G. Primenitel'No K Zadacham Radiovysotometrii" Moscow, Academy of Sciences USSR, 1974 p 1-51.

Descriptors: *Backscattering, *Mars surface, *Radar measurement, *Radio altimeters, Graphs (Charts), Reflectance, Tables (Data).

For abstract, see STAR 1314

N75-23442/7GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Processing of Radar Measurements of MARS from the Earth in 1971.
N. N. Krupenio, and V. A. Ladygin. May 75, 23p NASA-TT-F-16293
Contract NASW-2481
Tran-Transl. Into English from the Mono. "Obrabotka Radiolokatsionnykh Izmereniy MARS Zemli V 1971 G." Moscow, Academy of Sciences USSR, 1974 p 1-54.

Descriptors: *Backscattering, *Mars surface, *Radar measurement, Graphs (Charts), Numerical analysis, Reflectance, Tables (Data).

For abstract, see STAR 1314

N75-23443/5GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Interplanetary Magnetic Fields, Their Fluctuations, and Cosmic Ray Variations.
E. Barouch, and J. W. Sari. Apr 75, 20p NASA-TM-X-70881, X-692-75-85
Subm-Submitted for Publication.

Descriptors: *Cosmic rays, *Interplanetary magnetic fields, Independent variables, Neutrons, Radiation detectors, Turbulent flow.

For abstract, see STAR 1314

N75-23445/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
The Effect of a Planetary Surface Penetrator on the Soil Column Surrounding the Impacting Body.
M. B. Blanchard, and H. D. Shade. Apr 75, 17p NASA-TM-X-62428, A-6036

Descriptors: *Core sampling, *Impact tests, *Planetary surfaces, *Soil mechanics, Alloys, Contamination, Metal coatings, Spacecraft components.

For abstract, see STAR 1314

N75-23447/6GA PC$3.25/MF$2.25
Office National d'Etudes et de Recherches Aerospatiales, Toulouse (France). Dept. d'Etudes et de Recherches en Technologie Spatiale.
Microcraters Observed on Lunar Rock 15015 and Meteoroid Flux Microcrateres Observes sur la Breche Lunaire 15015 et Flux de Micrometeoroides.
J. C. Mandeville. Nov 74, 13p ONERA-DERTS-NT-01-17
Language in French.

Descriptors: *Apollo 15 flight, *Lunar rocks, *Micrometeoroids, *Particle flux density, *Projectile cratering, Calibrating, Chemical composition, Correlation detection, Density (Mass/volume), Geometry, Hypervelocity projectiles, Particle size distribution, Space environment simulation, Time dependence.

For abstract, see STAR 1314

N75-23450/0GA PC$3.25/MF$2.25
Maryland Univ., College Park. Dept. of Physics and Astronomy.
Unusual Emission of Iron Nuclei from the Sun.
G. Gloeckler, D. Hovestadt, O. Vollmer, and C. Y. Fan. 25 Apr 75, 14p NASA-CR-142712, TR-75077
Contract NAS5-11063

Descriptors: *Composition (Property), *Emission spectra, *Iron, *Solar activity, Abundance, Heavy ions.

For abstract, see STAR 1314

N75-23451/8GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Solpro: A Computer Code to Calculate Probabilistic Energetic Solar Proton Fluences.
E. G. Stassinopoulos. Apr 75, 27p NASA-TM-X-72573, NSSDC-75-11

Descriptors: *Computer programs, *Fluence, *Solar protons, Computerized simulation, Fortran, Mission planning, Probability theory, Solar cycles, Solar flux.

For abstract, see STAR 1314

N75-23452/6GA PC$3.25/MF$2.25
Osservatorio Astronomico, Rome (Italy).
Solar Phenomena.
Monthly Bulletin, Sep. 1974.
M. Cimino. Sep 74, 12p PUBL-197

Descriptors: *Astronomical observatories, *Sunspots, Italy, Periodic variations, Solar magnetic field, Solar spectra, Tables (Data).

For abstract, see STAR 1314

N75-23453/4GA PC$3.25/MF$2.25
Osservatorio Astronomico, Rome (Italy).
Solar Phenomena.
Monthly Bulletin, Oct. 1974.
M. Cimino. Oct 74, 10p PUBL-198

Descriptors: *Astronomical observatories, *Sunspots, Italy, Periodic variations, Solar magnetic field, Solar spectra, Tables (Data).

For abstract, see STAR 1314

N75-23454/2GA PC$3.25/MF$2.25
Academy of Sciences (USSR), Moscow. Inst. for Space Research.
Study of Solar Plasma Near MARS and Along the Earth to MARS Path by Means of Charged Particle Traps Aboard the Soviet Spacecrafts Launched in 1971-1973. Part 3: Characteristics of Ion and Electron Plasma Components in Antisolar Part of the Near-Martian Space as Measured Aboard the Satellite "Mars-5".
K. I. Gringauz, B. B. Bezrukikh, M. I. Verigin, and A. P. Remizov. 1974, 18p PR-192

Descriptors: *Earth-mars trajectories, *Mars environment, *Mars probes, *Solar wind, *U.s.s.r. space program, Bow waves, Charged particles, Electron plasma, Ion traps (Instrumentation), Shock waves, Trapped particles.

For abstract, see STAR 1314

N75-23464/1GA PC$3.75/MF$2.25
Maryland Univ., College Park. Dept. of Physics and Astronomy.
A Dynamic Model for the Time Evolution of the Modulated Cosmic Ray Spectrum.
J. J. Ogallagher, and G. A. Maslyar, Iii. May 75, 34p NASA-CR-142713, TR-75-079
Contract NGR-21-002-316

Descriptors: *Cosmic rays, *Dynamic models, Diffusion coefficient, Fokker-planck equation.

For abstract, see STAR 1314

PB-242 056/0GA PC$5.75/MF$2.25
Geological Survey, Flagstaff, Ariz. Branch of Astrogeology.
Apollo 14 Voice Transcript Pertaining to the Geology of the Landing Site. Volume 3.
Final rept.,
N. G. Bailey, and G. E. Ulrich. 1975, 150p USGS-GD-74-028
Prepared in cooperation with National Aeronautics and Space Administration, Washington, D.C. See also Volume 2, PB-241 811.

Descriptors: *Lunar geology, Lunar topography, Lunar structure, Lunar crust, Lunar bases, Lunar craters, Lunar dust, Lunar rock, Lunar photography, Lunar communication, Spacecraft communication, Voice communication, Data transmission, Manned spacecraft.
Identifiers: Apollo 14 spacecraft, Apollo.

This document is an edited record of the conversations between the Apollo 14 astronauts and mission control pertaining to the geology of the landing site. It contains all discussions and observations documenting the lunar landscape, its geologic characteristics, the rocks and soils collected, and the lunar surface photographic record along with supplementary remarks essential to the continuity of events during the mission. This transcript is derived from audio tapes and the NASA Technical Air-to-Ground Voice Transcription and includes time of transcription, and photography and sample numbers. The report also includes a glossary, landing site map, and sample table.

3C. Celestial Mechanics

AD-A011 575/8GA PC-GPO/MF$2.25-NTIS
Nautical Almanac Office Washington D C
Astronomical Papers. Volume XXII. Part II. A Discussion of the Observations of Neptune,
Edward S. Jackson. 1974, 112p
Prepared for American Phemeris and Nautical Almanac. See also report dated 1973, AD-773 811.
Availability: Paper copy available from GPO.

Descriptors: *Neptune(Planet), *Celestial mechanics, Ephemerides, Coordinates, Velocity, Tables(Data), Numerical integration, Planets.

The Royal Observatory at the Cape of Good Hope obtained a very long series of observations of Neptune with their heliometer. The positions of the reference stars in this series have been transferred to the system of FK3 and new residuals computed with respect to the ephemeris positions available at the time of observation. Differences between the ephemeris used by the Cape and that adopted by this investigation were computed and applied to the heliometer observations. Residuals with respect to both ephemerides are exhibited in the appropriately labeled table.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A011 253/2GA PC$6.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
Refractive Effects in Remote Sensing of the Atmosphere with Infrared Transmission Spectroscopy.
Final rept.,
Donald E. Snider, and Aaron Goldman. Jun 75, 151p Rept no. BRL-1790

Descriptors: *Atmospheric refraction, *Air mass analysis, *Ray tracing, Tables(Data), Atmospheric temperature, Atmospheres, Computer programs, FORTRAN.
Identifiers: Remote sensing, Atmospheric composition, Atmospheric pressure, FORTRAN 4 programming language.

A ray tracing technique which includes atmospheric refraction is used to tabulate the air mass and the single layer effective temperature and pressure for a grazing ray from the sun. Summer and winter atmospheric profiles are used with observer altitudes ranging from 10 to 50 km in steps of 1 km. Zenith angles ranging from 80 degrees up to 97 degrees are considered. Results indicate that neglecting refraction in the computation of air mass and effective pressure can lead to overestimates of these quantities by up to 25% for aircraft observers, 60% for high altitude balloons, and 200% for satellite observers.

AD-A011 371/2GA PC$3.75/MF$2.25
Lockheed Missiles and Space Co Inc Palo Alto Calif Palo Alto Research Lab
Ionospheric Irregularities: Auroral Motions and Plasma Drifts.
Final rept. 10 Jan-30 Sep 74,
Robert D. Sears. 7 Apr 75, 49p Rept no. LMSC/D405729 DNA-3514F
Contract DNA001-74-C-0179
See also report dated 4 Dec 73, AD-776 241.

Descriptors: *Ionospheric disturbances, *Aurorae, Radiance, Photometry, Particle flux, Intensity, Photometers, Spectral energy distribution, Coherence, Visible spectra, Velocity, Statistical data, Alaska.
Identifiers: E region, F region, Icecap operation.

Photometric measurements of auroral intensities and spatial structure were made at Chatanika, Alaska during 1973 and 1974. The auroral intensities measured during 1974 in support of the ICE CAP '74 program of experiments are analyzed in terms of the energy input from precipitating particles. Auroral motion data which were obtained during the ICE CAP '73 program are analyzed in terms of the direction and velocity of the wavelike structure of the auroras. These velocity data are compared with measurements of the ionospheric plasma motion made by the Chatanika incoherent scatter radar. Over a wide range of auroral conditions, at least part of the time, it is

found that the motions of auroral forms agree with the motion of the ionospheric plasma. This behavior suggests that both phenomena are driven by magnetospheric E-fields superimposed upon the ionosphere.

AD-A011 424/9GA PC$6.25/MF$2.25
Naval Research Lab Washington D C
Vertical Distribution of Water Vapor and Ozone over Washington, D.C. During 1971 through 1973.
Final rept.,
H. J. Mastenbrook, and D. R. Purdy. 20 May 75, 172p Rept no. NRL-7884

Descriptors: *Water vapor, *Ozone, *Stratosphere, Atmospheric sounding, Measurement, Distribution, Tables(Data), Graphs, District of Columbia.

Measurements of the vertical distribution of water vapor and ozone in the stratosphere at heights to 100,000 feet have been obtained at approximately 1-month intervals at a site near Washington, D.C. Data obtained during 1971 through 1973 are presented in tables and graphs.

AD-A011 426/4GA PC$3.25/MF$2.25
Naval Research Lab Washington D C
The Role of Non-Linear Frequency Shifts on the Type I Electrojet Instability.
Interim rept.,
P. E. Serafim, and K. Papadopoulos. Apr 75, 24p Rept no. NRL-MR-3043

Descriptors: *Ionospheric disturbances, Frequency shift, Instability, Dispersion relations.
Identifiers: E region, *Equatorial electrojet, Ion acoustic waves.

A theory of the type I electrojet instability is presented with consideration of the non-linear frequency shifts. It is shown that inclusion of the non-linear frequency shifts, provides the theoretical framework within which radar backscatter observations of vertical echoes and of the constant ion acoustic Doppler shift can be explained. Comparisons with a laboratory experiment are discussed.

AD-A011 443/9GA PC$3.25/MF$2.25
Office of Naval Research London (England)
Conference on Lightning and Static Electricity, Held at Culham Laboratory, Abingdon, England on 14-18 April 1975.
Conference rept.,
Marin S. Harris. 1975, 21p Rept no. ONRL-C-11-75

Descriptors: *Lightning, *Static electricity, *Meetings, *Aviation safety, Atmospheric electricity, Aircraft, Composite materials, Radomes, Inductance, Aircraft fires, Simulation.

A four-day international Conference on lightning and static electricity was sponsored by the Royal Aeronautical Society and the U.S. Atomic Energy Agency's Culham Laboratory at Culham on 14-18 April 1975. The meeting was primarily devoted to describing effects of lightning and static electricity on aircraft and components, laboratory simulation of these effects, and methods to prevent aircraft damage. This report discusses some of the European papers presented in the five sessions of the conference: Fundamental Aspects and Test Criteria, Fuels, Structures and Materials, Aircraft Application, and Missiles and Spacecraft.

AD-A011 602/0GA PC$4.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Composite PCA '69 Study.
Final rept.,
William Swider. 17 Mar 75, 56p Rept nos. AFCRL-ERP-500, AFCRL-TR-75-0149
See also AD-763 081.

Descriptors: *Polar cap absorption, *Solar disturbances, *Ionospheric disturbances, Solar radiation, Solar flares, Electron density, Ion density, Ozone, Ultraviolet radiation, Protons, Ultraviolet spectra, Visible spectra, Infrared spectra, Electrons, Electromagnetic wave propagation, Unmanned spacecraft, Atmospheric sounding, Ionospheric propagation, Ionization, Polar regions, Cosmic rays, Magnetic storms, Magnetosphere.
Identifiers: D region, Solar protons, ESRO 2 satellite, OV1-18 satellite, OV1-19 satellite, OV5-6 satellite, Explorer 41 satellite.

Data gathered during the 2 to 5 November 1969 polar cap absorption (PCA) event (or solar proton event-SPE) are summarized in this report. The atmospheric implications and findings are discussed in terms of five broad categories: Electron loss coefficients, Ion chemistry results, Neutral/motions results, UV/visible/IR results, and Electromagnetic propagation results.

COM-75-10733/4GA PC$3.25/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Atmospheric Physics and Chemistry Lab.
Zonal Profiles of Atmospheric Water Vapor.
Technical rept.,
P. M. Kuhn. Mar 75, 16p NOAA-TR-ERL-319, APCL-33 NOAA-75050902
Paper copy also available from GPO as C55.13:ERL-319-APCL-33.

Descriptors: *Water vapor, *Atmospheric composition, *Stratosphere, *Troposphere, Mixing, Infrared spectroscopy, Fluorescence.

Water vapor burden and in situ mixing ratios at high altitude flight levels were inferred from observations in the rotational water vapor spectral band. Flight levels averaged approximately 14.0 km during twenty-two zonal traverses aboard the NASA Ames Research Center's Airborne Infrared Observatory. The method of radiance observations to infer water vapor burden and concentration, while radiometric, involved emission observations rather than absorption spectra analysis employed by McKinnon and Morewood. The east-west flights were made during the February through December, 1974, period. They provided profiles of lower stratospheric and upper tropospheric water vapor from 30 to 50 degrees North latitude between 90 and 140 degrees West longitude.

COM-75-10751/6GA PC$3.25/MF$2.25
Science Applications, Inc., La Jolla, Calif.
A Study on the Determination of the Atmospheric Aerosol Content Using ERTS Data.
Final rept.,
M. Griggs. 17 Apr 75, 18p SAI-75-566-LJ NOAA-75050704
NOAA-4-35365

Descriptors: *Aerosols, *Upper atmosphere, *Radiance, *Turbidity, Remote sensing.
Identifiers: ERTS-1 satellite.

A previous study using ERTS-1 data showed a linear relationship between the upwelling radiance over water surfaces and the atmospheric aerosol content. This study identified seven NOAA-EPA turbidity network sites, plus the NASA-Houston network within the Houston area, as being suitable for providing further data points for the relationship. Analysis of ERTS-1 and turbidity data for the period July 1972 to May 1973, found 24 possible data points. Most of these turbidity values were below the normal aerosol contents and just two high values were judged suitable for checking the relationship where data points are presently sparse. It is recommended that the study be extended to cover ERTS-1 data for the period from May 1973 to January 1975, and to include the current and future Landsat 1 and 2 coverage which provide data every 9 days at each site.

N75-22977/3GA PC$3.75/MF$2.25
PBR Electronics, Inc., Athens, Ala.
Raman Backscatter Measurement Research on Water Vapor Systems.
Final Report.
G. L. Workman. 10 Apr 75, 37p NASA-CR-120741
Contract NAS8-30805

Descriptors: *Light scattering meters, *Raman spectra, *Water vapor, Atmospheric moisture, Laser applications, Light scattering.

For abstract, see STAR 1314

N75-22978/1GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Coulomb Collisions of Ring Current Particles: Indirect Source of Heat for the Ionosphere.
K. D. Cole. Apr 75, 22p NASA-TM-X-70885, X-621-75-108
Subm-Submitted for Publication.

Descriptors: *Coulomb collisions, *Heat sources, *Ionospheric heating, *Ring currents, Conduction electrons, Magnetic fields, Magnetic storms, Particle collisions, Particle interactions.

For abstract, see STAR 1314

N75-22979/9GA PC$4.25/MF$2.25
Denver Univ., Colo. Dept. of Physics and Astronomy.
Measurements of Atmospheric Emission Spectra in the 8.5MU M to 13.3MU M and 19.0MU M to 26.0MU M Regions at High Altitudes and Various Zenith Angles.
Final Report.
D. G. Murcray, J. N. Brooks, J. J. Kosters, and W. J. Williams. Apr 75, 65p NASA-CR-142726
Contract NGR-06-004-131

Descriptors: *Airglow, *Emission spectra, *High altitude, Balloon flight, Data reduction, Infrared radiometers.

For abstract, see STAR 1314

N75-22980/7GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
The Earth'S Trapped Radiation Belts.
NASA Space Vehicle Design Criteria (Environment).
R. B. Noll, and M. B. Mcelroy. Mar 75, 100p NASA-SP-8116

Descriptors: *Aerospace environments, *Radiation belts, Satellite observation, Spacecraft design.

For abstract, see STAR 1314

N75-22981/5GA PC$4.25/MF$2.25
Alabama Univ., Huntsville. Div. of Graduate Programs and Research.
Investigations of Atmospheric Dynamics Using a CW Doppler Sounder Array.
Final Technical Report.
G. L. Rao. Feb 74, 73p NASA-CR-120189
Contract NAS8-29317

Descriptors: *Continuous wave radar, *Doppler radar, *Ionospheric sounding, Annual variations, Atmospheric turbulence, Wind variations.

For abstract, see STAR 1314

N75-22984/9GA PC$4.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Ozone Observations Observations d'Ozone Quatrieme Trimestre 1970.
1974, 52p QR-4
In French and Dutch.

Descriptors: *Atmospheric composition, *Atmospheric density, *Ozone, Atmospheric diffusion, Belgium, Partial pressure, Spectrophotometry, Tables (Data), Temperature distribution.

For abstract, see STAR 1314

N75-22986/4GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, Juin 1974.
Monthly Bulletin, Jun. 1974.
Jun 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, *Seismology, Beta particles, Geophysical observatories, Tables (Data).

For abstract, see STAR 1314

N75-22987/2GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Geophysical Observations Observations Geophysiques Bulletin Mensuel, Juillet 1974.
Monthly Bulletin, Jul. 1974.
Jul 74, 26p
In French and Dutch.

Descriptors: *Atmospheric electricity, *Belgium, *Cosmic rays, *Geomagnetism, *Ionospheric propagation, *Seismology, Beta particles, Geophysical observatories, Tables (Data).

For abstract, see STAR 1314

N75-22988/0GA PC$3.75/MF$2.25
European Space Research Organization, Paris (France).
Optical Experiments in the Division for Extraterrestrial Sensor Techniques as a Contribution in the Field of Extraterrestrial Research.
D. Beran. Feb 75, 49p ESRO-TT-133, DLR-MITT-74-17
Tran-Transl. Into English of 'Opt. Experimente in der Abt. Extraterrestrische Sensortech. Als Beitr. Zur Extraterrestrischen Forsch.', Dfvlr, Porz, West Ger. Report Dlr-Mitt-74-17, 13 Mar. 1974. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 20.20 Dm.

Descriptors: *Aeronomy, *Airglow, *Sounding rockets, *Upper atmosphere, Astronomy, Light emission, Nitric oxide, Optical measurement, Polar regions, Ultraviolet spectra.

For abstract, see STAR 1314

PATENT-3 881 154 Not available NTIS
Department of the Air Force Washington D C
High Resolution, Very Short Pulse, Inosounder.
Patent,
Edward A. Lewis, John E. Rasmussen, John L. Heckscher, Paul A. Kossey, and Roger W. Whidden. Filed 13 Jul 73, patented 29 Apr 75, 11p Rept nos. PAT-APPL-379 026,
Supersedes AD-164 578.

Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Ionosondes, *Patents, Very low frequency, Low frequency, Signal processing, Time domain, Frequency, High resolution.
Identifiers: PAT-CL-325-67.

The patent describes a high resolution, super short pulse, VLF/LF ionosounder which transmits signals that arrive at a distant receiver both by traveling over the earth's surface and by reflection from the ionosphere. There is radiated such short pulses that the groundwave, which arrives at the receiver first, has past before the arrival of the skywave signal, giving a clean separation between the ground and skywave signals thus making it possible to study uncontaminated individual skywave reflections and also making possible very high resolution. Amplitude and phase information may be recovered by frequency or time domain processing.

4B. Meteorology

AD-A011 139/3GA PC$3.75/MF$2.25
Wyoming Univ Laramie Dept of Physics and Astronomy
An Airborn Condensation Nuclei Counter.
Annual rept. 15 Jun 73-14 Jun 74 (Final),
J. M. Rosen. Aug 74, 28p Rept no. CN-2
Contract N00014-70-A-0266-0011

Descriptors: *Condensation nuclei, *Aerosols, *Counters, Performance(Engineering), Particle size, Fines, Experimental design, Concentration(Composition), Altitude, Cloud chambers, Condensation.
Identifiers: Atmospheric composition.

Stratospheric measurements of particles smaller than 0.1 micrometer are clearly necessary. For this reason a new type of counter for detecting these small particles has been designed and built. For purposes of this report, particles smaller than 0.1 micrometer diameter will be referred to as condensation nuclei (CN) because this name reflects the method by which the concentration is measured. The CN are grown in a thermal gradient diffusion cloud chamber. This consists of a temperature controlled center rod kept moist with the working fluid. The outer wall is kept at constant temperature by an ice bath. The difference in temperature between the two walls and the vapor coming from the working fluid produces a degree of supersaturation in the TGDCC depending on the temperature of the center rod. After the sampled air has passed through the TGDCC, the enlarged particles are detected by a photoelectric particle counter. Testing and performance are described.

AD-A011 214/4GA PC$3.75/MF$2.25
Army Electronics Command Fort Monmouth N J
Remote Wind Sensing by Acoustic Radars.
Technical rept.,
M. Balser, C. A. McNary, A. E. Nagy, R. Loveland, and D. Dickson. Apr 75, 40p Rept no. ECOM-5560

Descriptors: *Wind velocity, *Anemometers, Acoustic equipment, Doppler systems, Measuring instruments, Acoustic detectors, Correlation techniques, Test methods, Statistical data, Atmospheric sounding, Echo ranging, Acoustic waves.
Identifiers: Remote sensing, *Acoustic radar, Atmospheric echo sounding.

Acoustic radar offers a reliable new technique for remotely measuring vector wind velocity. Engineered antenna systems have been constructed that effectively reject noise interference, and corresponding detection logic has been developed that identifies the wind velocity from the processed signal. Recent tests have demonstrated the agreement between the wind velocity measured by acoustic radar and that measured by conventional anemometer and vane instrumentation. Data from these tests are compared, representative differences between the two wind measurement techniques are shown, and statistics of the observable wind velocity are calculated. In addition, different system configurations and processing techniques are described that respond to various user requirements.

AD-A011 409/0GA PC$3.75/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
Basic ZOOM Program.
Computer programming note,
Gerd Wiese. Jan 72, 31p Rept no. EPRF-CP Note-3

Descriptors: *Weather forecasting, *Computer programs, Interpolation, FORTRAN.
Identifiers: Numerical weather forecasting, FORTRAN 63 programming language, ZOOM computer program.

The numerical hemispheric meteorological and oceanographic analyses are usually done on a fixed standard grid. FNWC normally maps the hemisphere on a 63 x 63 grid. The subroutine WINDOW selects a window of any desired size, location, and orientation out of this grid and zooms it to a wanted size (interpolation in space). The subroutine ARPOL calculates the forecast values of a window of any desired size, location, and orientation, which can be additionally zoomed to a wanted size, in shorter time steps than those of the given data (interpolation in time and space).

AD-A011 416/5GA PC$3.75/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
Program Graphic.
Computer programming note,
Carol A. Simpson, and David B. Johnson. Nov 73, 40p Rept no. EPRF-CP Note-11

Descriptors: *Wind, *Computer programs, Curve fitting, Plotting, Minicomputers, Cumulus clouds.
Identifiers: GRAPHIC computer programs, Varian 3100 computers.

Program GRAPHIC plots data generated by the CUMLIQ cumulus dynamic model. It uses the FNWC 6500 Varian Plot routines to generate a file on PLOT (a disc file internal to the FNWC 6500 system) which then drives the Varian plotter.

AD-A011 417/3GA PC$3.25/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
Subroutine SKEWTLP.
Computer programming note,
Agan Jules M. Ficke. Dec 73, 16p Rept no. EPRF-CP Note-12

Descriptors: *Atmospheric sounding, *Computer programs, Curve fitting, Plotting, FORTRAN.
Identifiers: SKEWTLP subroutine, FORTRAN 4 programming language, CDC 3100 computers.

Plotting of atmospheric sounding data on USAF Skew T, Log P diagrams is commonplace in meteorological work. Subroutine SKEWTLP allows computer plotting of this information. SKEWTLP is written in FORTRAN 4 and has been designed for use on the EPRF 3100 CDC computer.

AD-A011 454/6GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
A Relation Between Reflectivity and Mean Fall Speed in Hail.
Interim rept.,
Rosemary M. Dyer. 5 Jun 75, 3p Rept no. AFCRL-TR-75-0316
Pub. in Preprint Volume, Radar Meteorology Conference (16th), Houston, Texas, on April 22-24, 1975.

Descriptors: *Wind, *Hail, Doppler radar, Distribution functions, Spectrum analysis.

Vertical winds in precipitation can be derived from the Doppler velocity spectrum by comparing (V sub 0), the measured power-weighted mean vertical velocity, with (w sub 0), the mean obtained from the reflectivity factor, (Z sub e). In order to do this, the constants in the expression (W sub 0) = A(Z sup b, sub e) must be evaluated. This has been done previously by Rogers for rain, assuming Rayleigh scattering. In this paper, the formula is extended to the non-Rayleigh case of hail spectra. It is shown that b varies with wavelength, and that A depends both on wavelength and on whether the hail is wet or dry.

AD-A011 673/1GA PC$4.75/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Steady-State Solutions of a Diffusive Energy-Balance Climate Model and Their Stability.
Technical rept.,
Michael Ghil. May 75, 79p Rept no. IMM-410 AFOSR-TR-75-0796
Grants AF-AFOSR-2728-74, NsG-5034

Descriptors: *Climate, *Atmospheric circulation, *Atmosphere models, Mathematical models, Nonlinear differential equations, Partial differential equations, Heat balance, Ice, Computations, Stability, Theses.
Identifiers: Energy balance.

A diffusive energy-balance climate model is considered, governed by a nonlinear parabolic partial differential equation. Three positive steady-state solutions of this equation are found; they correspond to three possible climates of our planet: an interglacial (nearly identical to the present climate), a glacial, and a completely ice-covered earth. Also considered are models similar to the main one studied, and the number of their steady states are determined. All the models have albedo continuously varying with latitude and temperature, and entirely diffusive horizontal heat transfer. The diffusion is taken to be nonlinear as well as linear. The stability under small perturbations of the main model's climates are investigated. A stability criterion is derived, and its application shows that the 'present climate' and the 'deep freeze' are stable, whereas the model's glacial is unstable.

COM-75-10703/7GA PC$3.75/MF$2.25
Texas A and M Univ., College Station. Center for Applied Geosciences.
Hurricanes on the Texas Coast: Description and Climatology (1),
Walter K. Henry, and J. Patrick McCormack. Mar 75, 29p TAMU-SG-75-501 NOAA-75050701
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant. See also COM-75-10704.

Descriptors: *Hurricanes, *Tropical cyclones, *Coasts, Classifications, Storms, Damage, Identifying, Climatology, Dictionaries, Texas, Spaceborne photography.
Identifiers: Sea Grant Program, Texas Gulf Coast, Gulf Coast Region(United States).

This booklet is the first in a series of three which is designed to help Texans understand, prepare for, and recover from the harmful effects of hurricanes. This publication describes various types of tropical cyclones and hurricanes. The characteristics of hurricanes and their frequency of occurrence over sections of the Texas coast also are analyzed.

COM-75-10704/5GA PC$3.25/MF$2.25
Texas A and M Univ., College Station. Center for Applied Geosciences.
Hurricanes on the Texas Coast. The Destruction (2),
Walter K. Henry, Dennis M. Driscoll, and J. Patrick McCormack. Mar 75, 17p TAMU-SG-75-502 NOAA-75050702
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant. See also COM-75-10703 and COM-75-10705.

Descriptors: *Hurricanes, *Tropical cyclones, *Coasts, Damage, Storm surges, Wind(Meteorology), Floods, Hazards, Disasters, Precipitation(Meteorology), Texas.
Identifiers: Sea Grant Program, Texas Gulf Coast, Gulf Coast Region(United States).

The booklet is the second in a series of three discussing tropical storms and hurricanes, and their effects. It describes and explains the types of damage a hurricane can cause along the Texas coast and adjacent, inland areas. Hurricane-related events, such as storm surge, heavy rains, high winds, tornadoes, and resulting hazards, such as floods and downed electrical wires, are discussed. Special emphasis is given to types of destruction that occurred during previous hurricanes.

COM-75-10705/2GA PC$3.25/MF$2.25
Texas A and M Univ., College Station. Center for Applied Geosciences.
Hurricanes on the Texas Coast: Survival and Recovery (3),
Walter K. Henry, Dennis M. Driscoll, and J. Patrick McCormack. Mar 75, 22p TAMU-SG-75-503 NOAA-75050703
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant. See also COM-75-10704.

Descriptors: *Hurricanes, *Tropical cyclones, *Coasts, Damage assessment, Survival, Instructions, Disasters, Recovery, National government, State government, Local government, Texas.
Identifiers: Sea Grant Program, Texas Gulf Coast, Gulf Coast Region(United States).

The destructive ferocity of a hurricane is almost beyond comprehension. In one 24-hour period a hurricane can generate heat energy equal to 400 20-megaton hydrogen bombs and can circulate almost one trillion tons of air carrying 17 billion tons of water vapor. Cost of damages can exceed $1 billion. The booklet is part of a three-volume series concerned with the destructive potential of tropical storms and hurricanes that effect the Texas coast. It provides information to aid coastal residents in saving lives and describes what federal, state, and local agencies do before, during, and after a hurricane.

COM-75-10728/4GA PC$3.75/MF$2.25
Miami Univ., Coral Gables, Fla. Remote Sensing Lab.
Quantizing 3- and 5-cm Radar Hurricane Precipitation Data.
Final rept.,
H. V. Senn. Dec 74, 27p NOAA-75051214
Grant NOAA-03-4-022-98

Descriptors: *Hurricanes, *Precipitation(Meteorology), *Data processing, Surveys, Meteorological radar, Video signals, Weather, Attenuation, Correction, Video tapes, Recording systems.
Identifiers: Hurricane Ellen.

The radar video tape recording experiment in hurricane Ellen 1973 was continued by reading-out the data through the University of Miami Iso Echo Contour (IEC) system onto conventional Plan Position Indicator (PPI) scopes with seven levels of video. Equipment and data problems are detailed, and future plans to digitize and computer process the tape are outlined.

COM-75-10852/2GA PC$4.75/MF$2.25
National Oceanic and Atmospheric Administration, Washington, D.C. Federal Coordinator for Meteorological Services and Supporting Research.
The Federal Plan for Meteorological Services and Supporting Research, Fiscal Year 1976,
Clayton E. Jensen. Apr 75, 87p NOAA-75052013
Paper copy also available from GPO.

Descriptors: *Meteorological data, *Weather forecasting, *Research projects, Federal expenditures, Disasters, Weather observations, Warning systems, Meteorological satellites, Cost estimates, Meteorological instruments, Services, Weather communication, National government, Storms.

This is the eleventh Federal Plan in an annual series developed by the Federal Coordinator for Meteorological Services and Supporting Research to provide the Congress snd the Executive Branch with an overall coordinated plan for Federal meteorological services. An overview is given of the federal expenditures over the past decade along with the improvements in the national forecast and warning system. This system includes monitoring the atmosphere, preparing forecasts and warnings, and disseminating forecasts and warnings in a rapid and efficient manner. A major section discusses meteorological services in functional terms, such as observations, analyses and forecasts, communications, dissemination, and general agency support. The final section describes the meteorological satellite program.

COM-75-50192-02-09/GA
(Order as COM-75-50192-02)
National Marine Fisheries Service, Monterey, Calif. Pacific Environmental Group.
Teleconnections Between Northeastern Pacific Ocean and the Gulf of Mexico and Northwestern Atlantic Ocean,
James H. Johnson, and Douglas R. McLain. Jun 74, 12p NOAA-75051501-9
Included in Fishery Bull., v73 n2 p306-316 Apr 75.

Descriptors: *Air water interactions, *North Atlantic Ocean, *Mexico Gulf, Temperature, Heat transfer, Climate, Weather forecasting, Climate, Fisheries, North Pacific Ocean.

Anomalous large-scale air-sea interactions that took place over the Gulf of Mexico and the Atlantic Ocean off the southern coast of the United States in the winter of 1957-58 caused a change of sea-surface temperatures from near average values to cold anomalies of nearly 3.0C in some regions. Evidence suggests that the mechanism for the anomalous change in sea temperatures derived from frequent outbreaks of cold, North American continential air flowing over the Gulf and ocean waters with consequent anomalously high evaporation and sensible heat exchange. A contributing factor may have been divergence of surface waters with associated upwelling in regions of high cyclonic activity. These severe outbreaks of cold continental air over the eastern seaboard may be related to air-sea interactions in the Pacific thousands of miles distant.

JPRS-64924 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.

Physical-Statistical Method of Indicating Hail Clouds.
K. Stanchev, R. Petrov, and P. Boev. 5 Jun 75, 12p
Trans. of Khidrologiya i Meteorologiya (Bulgaria) v24 n2 p10-17 1975.

Descriptors: *Hail, *Clouds(Meteorology), Probability theory, Radar echoes, Translations, Bulgaria.

The report contains an analysis of the physical-statistical method of indicating hail clouds.

N75-22975/7GA PC$4.75/MF$2.25
New York Univ., N.Y. Courant Inst. of Mathematical Sciences.
Steady-State Solutions of a Diffusive Energy-Balance Climate Model and Their Stability.
M. Ghil. May 75, 79p NASA-CR-142705, IMM-410
Grant NSG-5034, Contract AF-AFOSR-2728-74

Descriptors: *Climate, *Heat balance, *Mathematical models, *Stability tests, *Steady state, Diffusion theory, Glaciology, Partial differential equations, Solar radiation.

For abstract, see STAR 1314

N75-23004/5GA PC$10.50/MF$2.25
World Meteorological Organization, Geneva (Switzerland).
Physical and Dynamic Climatology: Proceedings.
1974, 402p WMO-347
Subm-Sponsored in Part by Intern. Assoc. Of Meteorol. And Atmospheric Phys. Conf-Presented at Symp. On Phys. And Dyn. Climatol., Leningrad, Aug. 1971.

Descriptors: *Atmospheric circulation, *Climatology, *Conferences, *Meteorological satellites, Atmospheric models, Atmospheric turbulence, Long term effects, Solar radiation.

For abstract, see STAR 1314

N75-23051/6GA PC$3.75/MF$2.25
World Meteorological Organization, Geneva (Switzerland).
Climate under Glass.
J. Seemann. 1974, 49p WMO-373, TN-131

Descriptors: *Climatology, *Glass, *Heat balance, *Meteorological parameters, Agriculture, Annual variations, Atmospheric moisture, Illuminating, Soil moisture, Temperature effects.

For abstract, see STAR 1314

N75-23052/4GA PC$3.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Climatological Observations Observations Climatologiques Bulletin Mensuel, Novembre 1974.
Monthly Bulletin, Nov. 1974.
Nov 74, 15p
In French and Dutch.

Descriptors: *Belgium, *Meteorological parameters, *Tables (Data), *Weather stations, Atmospheric moisture, Beta particles, Fallout, Precipitation (Meteorology), Storms (Meteorology), Sunlight, Wind (Meteorology).

For abstract, see STAR 1314

N75-23053/2GA PC$3.25/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Climatological Observations Observations Climatologiques Bulletin Mensuel, Decembre 1974.
Monthly Bulletin, Dec. 1974.
Dec 74, 16p
In French and Dutch.

Descriptors: *Belgium, *Meteorological parameters, *Tables (Data), *Weather stations, Atmospheric moisture, Beta particles, Fallout, Precipitation (Meteorology), Storms (Meteorology), Sunlight, Wind (Meteorology).

For abstract, see STAR 1314

N75-23054/0GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Synoptic Observations Observations Synoptiques Bulletin Mensuel, Janvier 1974.
Monthly Bulletin, Jan. 1974.
Jan 74, 31p
In French and Dutch.

Descriptors: *Belgium, *Synoptic meteorology, *Tables (Data), *Weather stations, Periodic variations, Radiosondes.

For abstract, see STAR 1314

PB-242 158/4GA PC$9.25/MF$2.25
Utah State Univ., Logan. Div. of Research.
Inadvertent Weather Modification Proceedings from a Workshop Held at Logan, Utah on August 13-31, 1973,
Dean F. Peterson, and Gene L. Wooldridge. Aug 73, 320p NSF/RA/E-73-188
Grant NSF-GI-38505
Sponsored in part by American Society of Civil Engineers, New York and American Meteorological Society, Boston, Mass.

Descriptors: *Weather modification, *Meetings, *Air pollution, Agriculture, Climate, Clouds(Meteorology), Aerosols, Urban areas, Dust, Rainfall, Wind tunnels, Cooling towers, Urbanization.

Contents:
- The inadvertent impacts of agriculture on weather and climate and agricultural methods for amelioration of climatic stress;
- Weather modification and cooling towers (overt, inadvertent, cooling tower drift, and evaporative cooling towers general);
- Atmospheric effects of pollutants;
- Particle emissions from a large Kraft paper mill and their effects on the microstructure of warm clouds;
- Urban-industrial effects on clouds and precipitation;
- Some characteristics of a dusty rain in Yugoslavia;
- Disp
ersion of pollutants;
- Wind-tunnel simulation of atmospheric flow and dispersion;
- Inadvertent effects in weather modification.

PB-242 388/7GA PC$3.25/MF$2.25
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Cumulus Parameterization Theory in Terms of Feedback and Control.
Research rept.,
Wayne H. Schubert. Jun 74, 24p CSU-ATSP-226
Grant NSF-GA-33182
Also pub. as ISSN-0067-0340.

Descriptors: *Cumulus clouds, Convection, Differential equations, Boundary layer, Atmospheric temperature, Moisture, Heat budget, Water vapor, Interactions, Feedback.

The cumulis parameterization theory presented by Arakawa and Schubet (1974) describes the mutual interaction of a cumulus cloud ensemble with its large-scale environment. This mutual interaction can be subdivided into three interaction loops: feedback, static control, dynamic control. The mathematical formulation of each of these interaction loops is discussed. The feedback loop describes how the cumulus scale transport terms and source terms modify the large-scale temperature and moisture fields. The static control loop describes the normalized mass flux and the thermodynamic properties of each cloud type in terms of the large-scale temperature and moisture fields. The dynamic control loop describes how the large-scale fields control the total cloud ensemble vertical mass flux and its distribution among the various cloud types. The feedback, static control, and dynamic control loops constitute a closed parameterization theory. A simple formalism for the diagnostic use of the feedback and static control portions of the theory is presented.

TT-74-53070 PC$11.50/MF$2.25
National Science Foundation, Washington, D.C.
The Physics of Convective Clouds,
S. M. Shmeter. 1975, 464p
Trans. of mono. Fizika Konvekticikh Olakov, Leningrad, 1972 232p. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Cloud physics, Convection, Atmospheric models, Turbulence, Cumulus clouds, Thermodynamics, Humidity, Temperature gradients, Cumulonimbus clouds, Theorems, Vortices, Atmospheric motion, Precipitation(Meteorology), Mathematical models, Translations, USSR.

Atmospheric convection is one of the most important mesometeorological processes. The present monograph is intended to review the present state of micro and mesophysics of convective clouds as well as generalized results of experimental and theoretical investigations of different aspects of atmospheric convection. The factors determining mesostructure of convective cloud fields above continents and oceans are analyzed. Physical processes influencing the evolution of convection in clouds and in clear air are dicussed.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A011 314/2GA MF$2.25
General Research Corp Mclean Va Operations Analysis Div
Optimal Allocation of Budget Dollars Among Materiel Procurement Programs: A Mathematical Programming Model for Optimum Planning Over Time. Volume II. Adaptation to UNIVAC 1108 Usage.
Final rept.,
James T. Brumbelo, and Joseph J. Supplee. Jun 75, 86p Rept no. OAD-CR-97-Vol-2
Contract DAHC19-69-C-0017
See also Volume 1, AD-A010 727.
Availability: Available in microfiche only.

Descriptors: *Military procurement, *Budgets, *Management planning and control, *Mathematical programming, Decision making, Logistics planning, Linear programming, Computer programs, FORTRAN, Optimization, Allocations.
Identifiers: UNIVAC 1108 computers, Goal programming, Resource allocation.

This report concludes a series of research studies in the area of optimal allocation of

resources by means of mathematical programming techniques. The technique has several significant attributes: time-phased acquisition and disposition of resources are explicitly considered. Nonlinear non-convex constraints (and objective functions) are possible. The model has been successfully demonstrated on a major problem issue (the Materiel Procurement Priorities Review Committee, or MPPRC, deliberations in 1974) and has been turned over to an Army user group, the US Army Concepts Analysis Agency (CAA). The model can accept either of two primary problem structures: (1) maximize the effectiveness (or benefit) obtained from accomplishing various levels of effort subject to specified budgetary constraints, or (2) minimize the cost of achieving specified levels of effectiveness where budgetary constraints may or may not be imposed. Volume II describes the adaptation of the model to the CAA computer, the UNIVAC 1108.

AD-A011 401/7GA PC$3.75/MF$2.25
Army Aviation Systems Command St Louis Mo Systems Analysis Office
Users Manual: Forecast of Schedule/Cost Status Utilizing Cost Performance Reports of the Cost/Schedule Control Systems Criteria: A Bayesian Approach (FORTRAN IV).
Technical rept.,
Mark E. Barkley. Mar 75, 32p Rept no. AMSAV-D-75-2 USAAVSCOM-TR-74-60
See also report dated Jan 73, AD-754 576.

Descriptors: *Cost estimates, *Contracts, *Department of Defense, Forecasting, Decision making, Scheduling, Bayes theorem, Computer programs, FORTRAN, Statistical analysis, Logistics planning.
Identifiers: Bayesian estimation, FORTRAN 4 programming language.

This report presents a computer program of the Bayesian approach to forecasting cost and schedule performance by work breakdown structure as reported by Department of Defense (DOD) contractors. The technique uses the data from a DOD contractor Cost Performance Report as furnished to the Government under the Cost/Schedule Control Systems Criteria.

AD-912 416/5GA PC$13.00/MF$2.25
Office of the Comptroller of the Army, Washington, D.C. Directorate of Cost Analysis.
Army Force Planning Cost Handbook.
Jul 73, 558p
Distribution Limitation now Removed. Supersedes Report dated 1 Oct 71, AD-888 462L and Report dated 20 Dec 72, AD-908 245L.

Descriptors: *Army procurement, *Costs, *Management planning and control, *Army budgets, Handbooks, Military organizations, Army equipment, Manpower, Salaries, Tables(Data), Military requirements, Logistics, Army training, Job analysis.
Identifiers: Cost estimates, Military force mixes, Military planning, Resource allocations, Tables of organization and equipment.

The Army force planning cost handbook is a product of the force cost information system, an automated system designed and maintained by the office of the comptroller of the Army and the US Army management systems support agency. It contains US Army planning factors which can be used in estimating resource requirements and costs associated with Army force structures, missions and activities. Where appropriate, these generalized factors can be identified to the conventional budget structure and the five year defense program.

COM-75-10805/0GA PC$13.00/MF$2.25
George Washington Univ., Washington, D.C. Program of Policy Studies in Science and Technology.
Technological Innovation for Civilian, Social Purposes.
Final rept.,
Ellis R. Mottur. Jul 71, 574p NBS-GCR-42
Contracts NBS-CST-395, NBS-CST-463
Sponsored in part by Arms Control and Disarmament Agency, Washington, D.C. and National Aeronautics and Space Administration, Washington, D.C. Grant NGR-09-010-030.

Descriptors: *Technology innovation, Social change, National government, Government policies, Project planning, Research management, Federal budgets, Incentives.

The book sets forth a series of recommendations for public policy with respect to technological innovation--a national plan for shaping technology toward social ends. These recommendations arise from an examination of the processes of technological innovation, an appraisal of existing and proposed public policies for fostering technological innovation, and consideration of the special problems involved in converting a substantial portion of the nation's scientific and technological resources from defense-oriented to civilian, social programs.

N75-23367/6GA PC$0.80/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Handbook for Preparation of Work Breakdown Structures.
Feb 75, 26p NHB-5610.1

Descriptors: *Handbooks, *Nasa programs, *Project planning, *Technical writing, Format, Graphs (Charts), Personnel management, Project management.

For abstract, see STAR 1314

N75-23369/2GA PC$0.85/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Statements of Work Handbook.
Feb 75, 28p NHB-5600.2

Descriptors: *Handbooks, *Nasa programs, *Technical writing, Contracts, Editing, Format, Project planning.

For abstract, see STAR 1314

PB-242 179/0GA PC$4.75/MF$2.25
Institute for Defense Analyses, Arlington, Va. Program Analysis Div.
Approaches to the Treatment of Incommensurables in Cost-Benefit Analysis.
Final rept.,
Douglas C. Dacy, Robert E. Kuenne, and Martin C. McGuire. Jul 73, 93p P-966 NSF/RA/R-73/005, NSF/RDI-5
Contract NSF-C764

Descriptors: *Technology innovation, *Benefit cost analysis, Incentives, Economic factors, Social effect, Problem solving, Federal financing programs, Industrial research and development, Methodology, Management methods, Project planning, Decision making.
Identifiers: Incommensurables, Alternatives.

The report identifies the kinds of conceptual problems to be faced in determining the direct and indirect economic and social costs-benefits which would be generated by the utilization of federal funds for the execution of experiments to affect technological innovation in specific industries or national economic sectors. From this analysis, a preliminary statement of factors to be considered in allocating such federal funds is developed. Using these factors coupled with a social and economic costing mechanism, national problem areas which the Experimental R and D Incentives Program might effectively address are preliminarily defined, and the outline of an approach which would be effective in further refining them is developed. This report describes a methodology which can be used for making trade-offs between various experimental strategies.

PB-242 182/4GA PC$7.00/MF$2.25
Forecasting International Ltd., Arlington, Va.
A Study of the Criteria to be Used in the Selection of Projects.
Final rept.,
Marion J. Cetron. Dec 72, 186p NSF/RA/R-72-072, NSF/RDI-72
Grant NSF-C755

Descriptors: *Industrial research and development, *Management planning, *Project planning, Technological development, Aircraft industry, Iron and steel industry, Social effect, Decision making, Research support, Manpower utilization, Criteria, Quality of life, Economic forecasting, Selection.

The report describes and demonstrates a methodology for assessing the societal impacts of developing technology in the aircraft and iron and steel industries. The ultimate goal of the study was to demonstrate the applicability of the methodology to project selection and the expenditure of research funds. The study included a review of major industries and societal goals based on the published literature. A panel was then assembled to consider the ramifications of this technical information and to subjectively assess the societal impacts in 1977, 1982, and 1992. Through the medium of cross support and cross relevance matrices, the subjective judgement of the panel was quantified. These quantified judgements were then used to show how different societal and technological developments could be assessed. Based on this very small review panel assessment, the goals of improving productivity and trade balance were highlighted.

PB-242 185/7GA PC$3.75/MF$2.25
Mentoris Co., Sacramento, Calif.
Experimental Definition Phase for Marketing the NASA Automated Attendance Management System.
Final rept.,
Ewart E. Smith, W. J. Schimandle, and Elmer Dewey Hill. Sep 74, 43p NSF/RA/R-74-048
Grant NSF-DI-42350

Descriptors: *Technology transfer, *School districts, *Students, *Records management, Automation technology, Management methods, Juvenile delinquency, National government, Systems engineering, Marketing, Barriers, Attitudes, Investments, California.
Identifiers: *Attendance management, Public schools.

This report is part of a larger effort to explore how best to transfer technology which originated in Federal laboratories to the civilian/commercial sector. Based on the belief that such technology transfer situations are to some extent, unique and that therefore there are no generalizable, single-factor barriers or solutions applicable, Mentoris was contracted to carry out such a transfer according to a semi-structured work statement which emphasized the early establishment of formal linkages, the negotiations of commitments of substance, and the development of a technology transfer plan by all necessary participants for a successful transaction. The report discusses the transfer of an automated attendance management system to public school districts in California.

PB-242 186/5GA PC$7.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge.
Experimental R and D Incentives for Industry Cooperative Research Experiment.
Final rept. on Phase 1,

Nam P. Suh. Nov 73, 211p NSF/RA/R-73-006, NSF/RDI-6
Grant NSF-DI-38249
Report on MIT-Industry Polymer Processing Program.

Descriptors: *Industrial research and development, *Technology development, *Participative management, Universities, Industries, Cooperation, Project planning, Cost sharing, Incentives, Barriers, Experimental design, Government policies, Polymers, Industrial production, Processing.
Identifiers: *University industry relations.

This final report describes a potential experiment in cooperative research involving a university and an industry, whereby limited government cost-sharing is used as an incentive for establishing a long term cooperative research program. It describes the steps taken by the author in attempting to establish the cooperative program with industrial firms specifically inclined to exploit polymer processing technology. Barriers encountered, steps taken to overcome the barriers and conditions necessary to induce participation in the program are outlined. This study was one of several that led to the selection of three long term projects that comprise an experiment in cooperative research initiated by the R and D Incentives Office of the National Science Foundation.

PB-242 187/3GA PC$5.75/MF$2.25
Stanford Research Inst., Menlo Park, Calif.
Planning and Evaluation Assistance to the NSF Experimental R and D Incentives Program. The Federal Innovation Environment.
Final rept.,
Charles Williams, Egils Milbergs, Robert Quick, and John Ford. Jun 73, 145p NSF/RA/R-73-017, NSF/RDI-17
Grant NSF-C763

Descriptors: *Research management, *Technology innovation, *Federal programs, Incentives, Transportation, Urban development, Aerospace engineering, Nuclear power plants, Policies, Coordination.

The report examined various roles the National Science Foundation's Experimental R and D Incentives program (RDI) could play within the federal technological innovation environment. The history, organization, strategies, and funding patterns of federal and civilian departments and agencies concerned with technological innovation (such as HUD, DOT, DOD, AEC, NASA, IRS, etc.) were studies. The report characterizes federal civilian R and D and identifies and describes the nature and points of impact of the activities of these agencies on the technological innovation process. It synthesizes available information into conceptual frameworks for viewing federal innovation processes in such a way that more in-depth and detailed analyses and initiatives can be undertaken. The report recommends five experimental activities for the RDI program: policy information services; the coordination of selected innovations with multiple-incentive experiments; piggyback experiments (i.e., natural experiments); market creation experiments; and process/organizational experiments.

PB-242 188/1GA PC$5.75/MF$2.25
National Planning Association, Washington, D.C.
Transfer on Innovations in Fragmented U.S. Industries with the North Atlantic Fisheries as a Case Study.
Final rept.,
Ivars Gutmanis, George F. Sawdy, Rita A. McBrayer, and James H. Wyckoff. Nov 74, 148p NSF/RA/R-74-064
Grant NSF-C824

Descriptors: *Fisheries, *Technology utilization, *Decision making, Policies, Technology innovation, Marketing, Sales, Profits, Manpower, Subsidies, Recommendations, Economic factors, North Atlantic Ocean.

The report discusses various hypotheses about the factors making up a decision model of the innovation process (drawn generally from Rogers and Shoemaker) in relation to the operational characteristics of a fragmented industry. The context for this discussion is a case study of the American North Atlantic fishing industry. Based on statistical evidence and other published information (along with observational and anecdotal data), the discussion points out some special conditions in fragmented industries which affect the process of adoption of technical innovations. The report also makes policy recommendations focused on essentially non-technological factors that could affect the economic status of North American fisheries.

PB-242 191/5GA PC$3.75/MF$2.25
General Technical Services, Inc., Upper Darby, Pa.
Overcoming Barriers to Commercialization of Innovative Technology: Report of Workshop at 1974 Annual Conference American Association of Small Research Companies, Held in Washington, D.C. on January 23, 1974.
Final rept.,
S. Z. Cardon. Jan 74, 45p* NSF/RA/R-74-037
Grant NSF-DI-40611

Descriptors: *Technology innovation, *Technology utilization, Economic surveys, Workshops, Incentives, Federal assistance programs, Product development, Evaluation, Commercial development, Barriers, Industrial research and development, Factor analysis.
Identifiers: *Small businesses.

The report describes the activities of an incentives evaluation workshop conducted in 1974 in Washington, D.C. The main function of the workshop was to rate the effectiveness (as perceived by the American Association of Small Research Companies members) of a number of potential Federal incentives aimed at stimulating increased technological innovation and new product exploitation in small high technology companies. The report summarizes these findings, defines the 'small research company,' and discusses such companies' needs relative to government support.

PB-242 194/9GA PC$7.25/MF$2.25
Harbridge House, Inc., Boston, Mass.
Legal Incentives and Barriers to Utilizing Technological Innovation. Reference Edition.
Final rept.,
Richard I. Miller. Mar 74, 203p* NSF/RA/R-74-004, NSF/RDI-4
Contract NSF-C822

Descriptors: *Government policies, *Patents, *Law, Technology transfer, Inventions, Technology innovation, Economic characteristics, Attitude surveys, Incentives, Barriers, Interviews, Commercial relations, Competition, Licenses, Security.
Identifiers: Legal aspects, Trade secrets.

The report stems from a 1968 study by Harbridge House in Government Patent Policy and its effects on: (1) Industry participation in government research and development programs; (2) the commercialization of government-sponsored inventions; and (3) business competition in commercial markets. This further study deals with the entire body of law which affects the commercial development of technological innovation on its way to the marketplace. The research included in-depth studies of specific court cases, interviews, surveys, reviews of licensing policies and practices, and examinations of trade secret case data in six major industrial states and the FTC.

PB-242 205/3GA PC$5.75/MF$2.25
Denver Research Inst., Colo.
Federal Incentives for Innovation. Part I: Guidelines for Planning. Part II: The Innovation Process in the Private and Public Sectors.
Final rept.,
Martin D. Robbins, Colleen A. Burke, and J. Gordon Milliken. Nov 73, 136p NSF/RA/R-73-002A, NSF/RDI-2A
Grant NSF-C790
See also PB-242 206.

Descriptors: *Incentives, *Technology innovation, Government policies, National government, State government, Local government, Technological barriers, Risk, Industrial management, Decision making, Project planning, Objectives, Federal support programs.

The report covers a study designed to develop background information on the process of technological innovation and, based on such information, to suggest guidelines for program planning for the Office of Experimental R and D Incentives (RDI) of the National Science Foundation. Part I of the report discusses the innovation process in all its complexity, and proposes goals, policies, and objectives believed appropriate for RDI program planning. Possible program elements and priorities are identified, and policies and strategies are offered for the public and private sector offices. Part I concludes by suggesting some experimental selection criteria and a management approach for planning, designing, developing, implementing, and evaluating selected experiments. Part II presents background material used to develop the guidelines discussed in Part I, including an analysis of the innovation process in both private and public sectors.

PB-242 206/1GA PC$5.25/MF$2.25
Denver Research Inst., Colo.
Federal Incentive for Innovation. Working Paper 1. The Electric Power Research Institute: A Potential Case Study in Institutional Innovation.
Final rept.,
Theodore J. Gordon. Sep 73, 105p Working Paper-1 NSF/RA/R-73-002B
Grant NSF-C790
See also PB-242 205. Prepared in cooperation with Futures Group, Glastonbury, Conn.

Descriptors: *Technology innovation, *Electric power, *Industrial development, Organizations, Electric power generation, Electric power transmission, Utilization, Effectiveness, Assessment, Corporations, Economic changes, Impact, Research needs, Incentives, Federal programs.

This report deals with an institutional innovation: the Electric Power Research Institute (EPRI), a nonprofit corporation formed in 1972 by the utility industry to stimulate research and development in the generation, transmission, and utilization of electrical energy. The report discusses the conditions which brought about EPRI, including the growing pressures and turmoil in the industry. Its major focus is on the measurement of success of such institutions, from the standpoint of both those who conceive of and work in such institutions and those on whom such institutions impinge. The report examines the nature of the expected changes and presents an approach to measure their intended and unintended consequences.

PB-242 223/6GA PC$4.25/MF$2.25
Ewald (William R.) Jr., Washington, D.C.

Graphics for Regional Policy Making, a Preliminary Study.
William R. Ewald, Jr. 17 Aug 73, 71p NSF/RA/X-73-013

Descriptors: *Regional planning, *Management systems, *Computer graphics, Policies, Management planning, Analyzing, Systems analysis, Information retrieval, Computer technology, Command and control, Meetings.
Identifiers: Policy making.

This report identifies and studies the capabilities of a number of tools for analysis/synthesis and communication, especially computer-assisted graphics. It discusses the potential of this technology for managing change. Part 1 outlines the features of the analysis/synthesis/communication tools needed to help formulate better policy to conserve and develop resources. Part 2 is a preliminary effort to match that needed with technology which is already evolving.

PB-242 225/1GA PC$9.50/MF$2.25
Syracuse Univ. Research Corp., N.Y.
Federal Laboratories and Technology Transfer: Institutions, Linkages, and Processes.
Final rept.,
Albert Teich, and W. Henry Lambright. Mar 74, 347p* NSF/RA/R-74-018, NSF/RDI-18
Grant NSF-C832
Prepared in cooperation with State Univ. of New York, Syracuse.

Descriptors: *Research management, *Technology transfer, *Federal programs, Manufacturing, Utilization, Hospitals, Chemical analysis, Artificial kidney, Protective clothing, Fire fighting, Warning systems, Active communication satellites.

The study placed special emphasis on the nature and development of linkages among the necessary participants involved in the transfer process, and is based on a conceptual model of technology transfer which assumes that there are three basic functions involved: innovation, manufacture, and utilization. The 11 cases studied were a silent communication alarm network, an electrical switchpack, an automated chemical analysis method, slippery water, a rechargeable cardiac pacemaker, an artificial kidney, an automated hospital room, firefighters protective clothing, a microwave landing system, and the synchronous communications satellite. Four items were explored in each case: (1) The nature of the transfer; (2) The state of completion of the transfer process; (3) Key factors in the case; and (4) Roles and linkages involved.

PB-242 228/5GA PC$4.75/MF$2.25
Atlanta, Ga.
An Evaluative Commentary on Science Activities in Georgia.
Final rept.,
John E. Mock. Aug 72, 88p NSF/RA/R-72/041, NSF/RDI-41

Descriptors: *Research support, *State programs, Decision making, Problem solving, Technology development, Management methods, Technology innovation, Participative management, Organizations, Barriers, Recommendations, Georgia, Local government activities, State government.
Identifiers: Commissions(Organizations).

This report describes the evolution and conduct of state-supported science activities in the state of Georgia, as exemplified by the Georgia Science and Technology Commission, and relates this experience to how science can be incorporated into governmental decision-making--into the mainstream of state and local government action--particularly with respect to identifying (1) problems amenable to science- or technology-aided solutions and (2) specific mechanisms for bringing science and technology to bear on these problems. The Commission's experience is traced in terms of its management and operational philosophies and practices, its objectives and efforts, and its relationship to other science policy participants.

PB-242 265/7GA PC$5.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.
Priority Research Needs on Technology-Related Transnational and Global Policy Problems.
Final rept.
Jul 73, 110p C/73-6 NSF/RA/X-73-007
Grant NSF-GI-37754
Report on a Workshop, Brookline, Mass. Under the Joint Sponsorship of M.I.T. and NSF, 7-8 Mar 73.

Descriptors: *Technology development, *International relations, *Meetings, Energy budget, Policies, Environmental issues, Ocean engineering, Technology transfer, Weather modification, Communications management, Nutrition, Problem solving, Arms control, Organizations.

Results are given of a workshop convened to provide advice to the National Science Foundation on the development of a program of research on technology-related transnational problems. Scholars and policy-makers discussed the need for the program, some specific areas in which it might concentrate resources, and procedures for the development of the program over time. Initial problem area recommendations were: International aspects of energy policy; International environmental management; Oceans policy; International technology transfer; and Technology-related arms control problems. Ten papers which were presented at the workshop are included.

PB-242 305/1GA PC$5.25/MF$2.25
Auburn Univ., Ala. Engineering Experiment Station.
System Design for Linking Research and Technological Resources to Needs of State Legislatures.
Final rept.,
J. Grady Cox, and Gerald W. Johnson. 28 Feb 74, 105p NSF/RA/R-74-029
Grant NSF-DI-39498

Descriptors: *Technology utilization, *State government, *Management information systems, Decision making, Government policies, Technical assistance, Resource allocation, Systems analysis, Scientific research, Legislation, Alabama, User needs, Recommendations.
Identifiers: Legislators, Research utilization.

This report describes a study which investigated the possibilities of linking existing scientific and technological resources in the State of Alabama to the needs of the Alabama State Legislature. Data was collected on the science and technology needs of the Alabama legislators, on the science and technology content of legislation proposed during the 1973 session of the Alabama Legislature, and on existing science and technology resources in the State. The report contains an analysis and evaluation of this data, with conclusions and recommendations for a proposed system designed to link these needs and resources. Although this study was confined to the State of Alabama, the conclusions and recommendations are believed to be applicable to other state legislatures.

PB-242 323/4GA PC$3.75/MF$2.25
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
Experiment Definition: R and D Incentives of an Electronic Telephone System.
Final rept.,
Richard A. Thompson. 1 May 74, 45p
NSF/RA/R-74/032
Grant NSF-DI-39553

Descriptors: *Research projects, *Telephone systems, *Cooperation, Universities, Industries, Experimental design, Cost sharing, Incentives, Federal assistance programs, National government, Business organizations, Participative management, Barriers, Problem solving, Electronic engineering.
Identifiers: *University industry relations.

This final report describes a potential experiment in cooperative research involving a university and an industry, whereby limited government cost-sharing is used as an incentive for establishing a long term cooperative program. It described the steps taken in attempting to establish the cooperative program with industrial organizations specifically inclined to exploit communication interconnect technology. Barriers encountered, steps taken to overcome the barriers, and conditions necessary to induce industrial participation in the program are outlined. The study was one of several that led to the selection of three long term programs that comprise an experiment in cooperative research initiated by the R and D Incentives Office of the National Science Foundation.

PB-242 325/9GA PC$3.25/MF$2.25
Diebold Inst. for Public Policy Studies, Inc., New York.
The Role of Private Industry in the Delivery of Public Services at State and Local Levels.
Final rept.,
Steven Isenberg. Sep 74, 24p NSF/RA/R-74-042

Descriptors: *Services, *Private industry, *Public administration, Technological transfer, Industrial management, Objectives, Forecasting, State government, Local government.

The report attempts (1) To briefly outline, by selected functional areas, the role of the private sector as contractor or competitive provider of goods and services; (2) to discuss the reasons for encouraging and using private sector resources and dynamics in the public sector; (3) to forecast what this experience and outlook may hold for the future; and (4) to advance some thoughts on how that relationship might better be constructed to help accomplish public goals.

PB-242 352/3GA PC$4.25/MF$2.25
Indiana Univ., Bloomington. School of Public and Environmental Affairs.
A Background Study of Technology Utilization in the Field of Public Works. Volume I. Summary.
Final rept.,
Ralph K. Jones, Martin J. Manning, and Donald M. Goldenbaum. Mar 74, 62p NSF/RA/R-74-047
Grant NSF-DI-38422
Prepared in cooperation with American Public Works Association, Chicago, Ill. Research Foundation.

Descriptors: *Management systems, *Technology utilization, *Public works, Coordination, Management engineering, Organizations, Systems analysis, Management guidelines, Universities, Technology innovation, Research management.
Identifiers: Liaison.

The report summarizes the findings of a background study on the utilization of technology in the public works field. The objec-

tive of the study is to identify and analyze the problems faced by public works officials in bringing new or improved technology to bear on their operations, and to develop means by which a major professional association (the APWA) might help to overcome those problems. The problems of technology utilization were found to be systemic in nature, and a long-range action program was recommended to design and test a formal Public Works Technology Coordination System (PWTCS). This system would be designed to bridge the gap between existing public works and technology management systems, to provide liaison with other key organizations.

PB-242 357/2GA PC$4.75/MF$2.25
Fairfax County Office of Research and Statistics, Va.
Feasibility of a Transferable Development Rights Program for Fairfax County.
Feasibility study,
Mary Elizabeth Holbein. Oct 74, 81p
FXCO/ORS-75/6, PLUS Working Paper-7

Descriptors: *Regional development, *County planning, *Land use, Land planning, Transferring, Legislation, Surveys, Feasibility, Virginia, Recommendations.
Identifiers: Transferable development rights, Fairfax County(Virginia).

The transfer of development rights is the transfer from one parcel to another of density, or the right to build a number of housing units or amount of floor area. The concept assumes that density is a legal and economic entity which can be separated from the basic location of the land itself. This feasibility study explores the basic characteristics of TDR, the various forms the concept has taken in practice, and the advantages of it as a land use control. The report outlines elements in existing Virginia legislation which are applicable to implementating a density transfer program. It also presents various applications which may be feasible in Fairfax County.

PB-242 384/6GA PC$4.25/MF$2.25
Williams (Charles W.), Inc., Alexandria, Va.
Federal Technical Assistance and the NSF RDI Program.
Final rept.,
Charles W. Williams, Jr., and Thomas H. Givens. Jul 74, 56p NSF/RA/R-74-036

Descriptors: *Intergovernmental relationships, *Technology innovation, *Federal assistance programs, *Technical assistance, Evaluation, Organizations, Management methods, National government, Financial management, Policies, Project planning, Incentives.
Identifiers: Alternatives, Federal agencies.

This report is primarily concerned with the intergovernmental aspects of technical assistance from the federal government, and ways in which federal agencies can improve the innovation process. A brief overview of present federal technical assistance activities is presented along with a conceptual outline for a strategic evaluation of these activities. The paper describes the present NSF/RDI program and its potential relationships with federal technical assistance, and outlines three basic alternatives open to the RDI program to increase the rate of innovation: Adopt a strategic policy evaluation for federal technical assistance; develop a program of natural experiments around technical assistance; or combine the work of these two alternatives to yield a strategic evaluation/natural experiment program.

PB-242 402/6GA PC$4.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge.
Proceedings of the M.I.T. Symposium on Strategies for A.I.D. Programs in Selected Areas of Science and Technology. Volume 1. Summary,
J. P. Ruina. Apr 74, 62p
Contract AID/ta-1067
Report on Technology Adaptation Program. See also Volume 2, PB-242 403.

Descriptors: *Technology utilization, *Economic development, *Meetings, Developing countries, Scientific research, Policies, Projects, Construction, Transportation, Housing planning, Water resources, Nutrition, Management planning.
Identifiers: *Research utilization, University industry relations.

MIT sponsored a symposium in April, 1974, to examine areas of science and technology that might merit more attention in the future as well as to consider the scope, balance and perspective of the TA/OST program within the context of current needs and conditions in developing nations. The subjects considered were construction, transportation, housing, water resources and nutrition. The four volumes of this report contain most of the papers that were commissioned to formulate questions and issues.

PB-242 403/4GA PC$6.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge.
Proceedings of the M.I.T. Symposium on Strategies for A.I.D. Programs in Selected Areas of Science and Technology. Volume 2. Housing, Transportation and Water Resources,
J. P. Ruina. Apr 74, 164p
Contract AID/ta-1067
Report on Technology Adaptation Program. See also Volume 1, PB-242 403 and Volume 3, PB-242 404.

Descriptors: *Technology utilization, *Economic development, *Meetings, Housing planning, Developing countries, Self help housing, Highway planning, Transportation planning, Urban transportation, Water resources, Water management, Economic models, Construction.
Identifiers: Incremental construction.

The report contains materials on the part of a technology utilization symposium devoted to housing, transportation, and water resources, principally in the developing nations.

PB-242 471/1GA PC$5.25/MF$2.25
Stanford Research Inst., Menlo Park, Calif.
On Modeling the Process of Innovation in the Economy's Private Sector. Volume I.
Final rept.,
Edward C. Wood. Mar 75, 117p* NSF/RDA-73-26-1
Grant NSF-RDA73-07238

Descriptors: *Private industry, *Technology innovation, *Economic models, Concepts, Hypotheses, Mining industries, Agriculture, Construction industry, Transportation development, Printing and publishing, Corporations.
Identifiers: Uncertainty, Case histories.

The objective of this study was to generate concepts and hypotheses that could be linked into a model or models of the process of technological innovation. These were based on a study of thirty specific innovation case histories.

PB-242 549/4GA PC$4.75/MF$2.25
Pennsylvania State Univ., University Park. Inst. for Research and Human Resources.
Diffusion of Technology in State Mission-Oriented Agencies.
Summary rept. (Final),
Irwin Feller, Donald C. Menzel, and Alfred J. Engel. Dec 74, 82p NSF/RDA-73-24-2
Grant NSF-DA-39596

Descriptors: *Technology innovation, *State government, Acceptability, Intergovernmental relationships, Organization theory, Technology utilization, Air pollution, Safety, Highways.

The report summarizes the results of an exploratory study that investigated the diffusion of technological innovations in the public sector. In particular, it describes the pattern of adoption of two technologies in each of two functional areas of state government in all fifty states and relates a computed measure of adoption for each of these technologies to a set of hypothesized independent variables in ten states.

PB-242 550/2GA PC$11.50/MF$2.25
Georgia Inst. of Tech., Atlanta. Advanced Technology and Science Studies Group.
Technological Innovation: A Critical Review of Current Knowledge. Volume I. The Ecology of Innovation.
Final rept.,
Patrick Kelly, and Melvin Kranzberg. Feb 75, 464p* NSF/RDA-73/25/1
Grant NSF-DA-39269
See also PB-242 551.

Descriptors: *Technology innovation, *Reviews, Environmental issues, Organizational development, Assessments, Management methods, Industrial development, Research, Technology transfer, International relations, Bibliographies, Diffusion, Forecasting, Economic effects, Measurement, Organizations, Systems analysis, Social effect, Mathematical models.
Identifiers: Aggregation.

This volume contains an interdisciplinary literature survey and critical assessment of current knowledge of processes of technological innovation. An ecological perspective is taken, which stresses the relationships of innovation to the environment in which it occurs and of various innovative activities with each other. The assessment is structured along three dimensions: levels of aggregation (the immediate context in which innovation occurs, such as the laboratory or the firm, and the larger context, such as the national or international context); variables of aggregation; and process phases such as the distinction between innovation and diffusion. The report attempts to assess theory and empirical evidence and offers suggestions for further research and theoretical development.

PB-242 551/0GA PC$13.00/MF$2.25
Georgia Inst. of Tech., Atlanta. Advanced Technology and Science Studies Group.
Technological Innovation: A Critical Review of Current Knowledge. Volume II. Aspects of Technological Innovation. Consultants' Papers.
Final rept.,
Patrick Kelley, and Melvin Kranzberg. Feb 75, 550p* NSF/RDA-73/25/2
Grant NSF-DA-39269
See also Volume 1, PB-242 550, and Volume 3, PB-242 552.

Descriptors: *Technology innovation, *Reviews, Natural resources management, Economic effects, Business organizations, Industrial development, Behavioral sciences, Methodology, Diffusion, Communicating, Forecasting, Economic growth, Bibliographies, Assessments, Research and development.
Identifiers: Inventors.

The volume contains nine commissioned papers dealing with special aspects of technological innovation processes. The authors were asked to assess the state of knowledge in their respective research areas to contribute to the overall assessment contained

in Volume 1. The titles refer to worksheet inventors, natural resources, econometrics, firms and industries, methodology for behavioral aspects, neglected sectors, diffusion, forecasting, and economic growth.

PB-242 552/8GA PC$17.25/MF$2.25
Georgia Inst. of Tech., Atlanta. Advanced Technology and Science Studies Group.
Technological Innovation: A Critical Review of Current Knowledge. Volume III. Cross-Classifications of Project Bibliography.
Final rept.,
Patrick Kelley, and Melvin Kranzberg. Feb 75, 731p* NSF/RDA-73/25/3
Grant NSF-DA-39269
See also Volume 2, PB-242 551, and Volume 4, PB-242 553.

Descriptors: *Technology innovation, *Reviews, Bibliographies, Classifications, Coding, Bibliographies, Diffusion, Industries, Organizations, Theory, Economic studies, Descriptions, Hypotheses, Tests, Standard industrial classifications, Assessments.
Identifiers: Variables, Processes.

This volume contains a bibliography and cross-classification of about 1900 literature items which were examined and coded to become the literature base for an assessment of current knowledge about technological innovation. The following dimensions were coded: Process Phases (R&D, Diffusion, etc.); Process Context (Industry, Government Agency, etc.); Procedural Approach (Case Study, Experiment, etc.); Purpose (Theoretical Development, Hypothesis Testing, etc.); Types of Variables (Organizational, Economic, etc.); Description (Process, Product, etc.); Standard Industrial Classification (sic) Code.

PB-242 553/6GA PC$11.50/MF$2.25
Georgia Inst. of Tech., Atlanta. Advanced Technology and Science Studies Group.
Technological Innovation: A Critical Review of Current Knowledge. Volume IV. Selected Literature Abstracts.
Final rept.,
Patrick Kelly, and Melvin Kranzberg. Feb 75, 460p* NSF/RDA-73/25/4
Grant NSF-DA-39269
See also Volume 3, PB-242 552.

Descriptors: *Technology innovation, *Reviews, Abstracts, Criteria, Relevance, Frequency, Utilization, Documentation, Methodology, Hypotheses, Experimental data, Opinions.
Identifiers: Scope.

The abstracts of selected literature items that are contained in this volume were prepared in the course of a review and assessment of the current knowledge of the process of technological innovation. Three criteria were employed in determining which items were to be abstracted. First, those items that were identified by consultants as among 'the ten most important contributions to the field' were abstracted on the basis of their expert judgment. Second, those literature items that were referenced most frequently were abstracted. Finally, abstracts were prepared for a number of items because they were found to be particularly useful in the course of the investigation. The content of the abstracts includes: bibliographic data, scope (or topic), methodology, assumptions, hypotheses, empirical findings, previous work, and conclusions.

PB-242 748/2GA PC$3.75/MF$2.25
Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.
Field Studies of the Technological Innovation Process. Executive Summary.
Summary rept.,
Albert H. Rubenstein, Alok Chakrabarti, and Robert D. O'Keefe. 15 Sep 74, 30p 74-96
NSF/RDA-73-27-2
Grant NSF-DA-39470

Descriptors: *Technology innovation, *Industrial research and development, *Industrial surveys, Factor analysis, Barriers, Incentives, Reviews, Business organizations, Policies, Attitudes, Opinions.
Identifiers: Field studies.

Field studies were carried out in 10 industrial organizations on factors that were perceived to significantly affect the research and development/innovation (RD/I) process. Such factors include both barriers and facilitators in the RD/I process. An initial list, in the form of propositions and variables, of more than 200 such factors was developed from these sources: the empirical literature on the RD/I process; Northwestern University research on this subject, involving field research in more than 1,000 organizations over a 20 year period; and the insights of participants in and observers of the RD/I process.

5B. Documentation and Information Technology

AD-A011 144/3GA PC$3.25/MF$2.25
Informatics Inc Rockville Md
SOVRaD - A Digest of Recent Soviet R and D Articles. Volume 1, Number 4, 1975,
S. Hibben, L. Boylan, J. Kourilo, B. Shresta, and M. Ness. Apr 75, 21p
Contract N00600-75-C-0018, DARPA Order-2790
See also report dated Mar 75, AD-A009 249.

Descriptors: *Scientific research, *USSR, *Periodicals, Laser beams, Bioluminescence, Radar signals, Electron beams, Plasmas(Physics), Composite materials.

This is a collection of brief abstracts on miscellaneous topics from the current Soviet technical literature. The intent is to supply a quick look at items of possible interest, including topics not necessarily named in the DARPA interest profile, as a supplement to the reportage on specified topics. It is intended to publish this collection on a monthly basis, to continue to provide prompt coverage of numerous aspects of Soviet R and D. As an added feature, all recently acquired books will be listed as they are received. A list of source abbreviations is appended.

AD-A011 181/5GA PC$12.00/MF$2.25
Army Research Office Durham N C
Research in Progress during Calendar Year 1973. U.S. Army Research Office.
1973, 484p
See also report dated 1972, AD-766 223.

Descriptors: *Army research, Abstracts, Physics, Chemistry, Mathematics, Engineering, Metallurgy, Atmospherics, Information sciences.

Reports are presented on Army research investigations in nuclear, atomic, molecular, plasma and general physics, cryophysics and liquids; electromagnetic radiation and optics; inorganic, analytical, organic, structural, polymer, and electrochemistry; mathematics and operations research, statistics; information sciences; mechanics, electronics, power, materials; metallurgy; and environmental sciences.

AD-A011 405/8GA PC$3.75/MF$2.25
Calspan Corp Buffalo N Y
Reentry Data Facility Users Guide.
May 75, 27p
Contract DAHC60-73-C-0003

Descriptors: *Information centers, *Radar tracking, Guided missiles, Data processing, Information retrieval, User needs, Facilities, Data bases, Manuals.

The RDF (Reentry Data Facility) has been established to service the large collection of field data and associated documentation covering some 16 years of down-range radar data gathering and processing. The objectives of the Reentry Data Facility are to preserve and organize MSR (Missile Site Radar), TTR (Target Track Radar), and DR (Discrimination Radar) mission data and mission-related documentation that are of value for the support of reentry physics investigations; provide qualified users with access to the data/documents; and service user requests for data/documents. To this end, the RDF has systematically filed the data and associated documents from all three radars, maintains the capability to reprocess and format data in accordance with user requests, provides for the reproduction and delivery of data, and will periodically inform the reentry community of all available RDF capabilities and services.

AD-A011 448/8GA PC$4.25/MF$2.25
Battelle Columbus Labs Ohio
Thesaurus for EDU Diving Information Center (D. I. C.).
Summary rept.,
R. M. Linebaugh. 20 Jul 75, 68p SuPDiv-3-75
Contract N00014-72-C-0078
Supersedes report dated 21 Jun 74, AD-784 931.

Descriptors: *Index terms, *Thesauri, *Diving, Vocabulary, Data bases, Information processing, Navy, Marine engineering, Oceanography, Salvage, Physiology, Psychology, Medicine.

In development of a computerized information system it is essential to have a controlled vocabulary for both input and search purposes. The Diving Information Center (DIC) at the U.S. Navy Experimental Diving Unit is developing a computerized system, utilizing inputs from the data bases at Diver Equipment Information Center at Battelle Columbus Laboratories and the Undersea Medical Society, as well as internal EDU inputs. It is important that the three input systems be compatible. A thesaurus was developed to provide that compatibility by integrating and correlating the current indexing terms from the above three systems into one thesaurus. Provision was made for the addition of the new terms. This edition of the thesaurus updates and replaces the previous edition.

COM-75-10735/9GA PC$9.25/MF$2.25
Florida Dept. of Commerce, Tallahassee. State Manpower Services Council.
Development and Design of an Occupational Information and Delivery System for Florida.
Technical assistance project rept.,
James R. Tarr, and Timothy A. Campbell. May 75, 317p* EDA-75-01
Grant EDA-04-06-01109

Descriptors: *Information systems, *Employment, Occupational requirements, Personnel development, Manpower utilization, Placement, Salaries, Human resources, Industrial training, Skills, Labor market, Forecasting, Florida.

The report is the initial step in the development and implementation of an on-going occupational information system for the state of Florida and its sub-state planning regions. It provides an inventory and assessment of existing systems and programs that provide supply and demand information on employment and occupations; a listing of occupational information needs submitted by manpower and educational planners; a comprehensive occupational needs statement; a design of the demand com-

ponent; a design of the supply component; the interfacing of the supply and demand components; and a listing of recommendations for further study to improve the quality of the input and output of the Occupational Information and Delivery System.

COM-75-10807/6GA PC$4.75/MF$2.25
Mitre Corp., Bedford, Mass.
State Telecommunications Data Base Structure.
Final rept.,
Theodore Zois, H. Glazer, C. F. Nuthmann, J. C. Proctor, and M. P. Talbot. May 74, 93p OTR-74-37
Contract C-2-35607
Paper copy also available from GPO.

Descriptors: *Telecommunication, *Information systems, Data transmission, Data processing, State programs, Information retrieval.

The report defines a state-oriented telecommunications data base structure developed to support the internal needs of the Office of Telecommunications, U.S. Department of Commerce. The structure contains three major sections: (1) State/Regional/Local/Federal Descriptive Information, (2) Telecommunications Information, (3) Information References. The report should be useful to anyone contemplating an automated information system, especially concerning telecommunications.

COM-75-50141-06/GA PC-GPO/MF$2.25-NTIS
National Bureau of Standards, Washington, D.C.
Dimensions/NBS. Volume 59, Number 6, June 1975.
Monthly technical news bulletin.
Jun 75, 25p NBS/DIM-59/6
Library of Congress Catalog Card no. 25-26527.
Paper copy available from GPO on subscription or per copy.

Descriptors: *Research projects, *Periodicals, Metric system, Fires, Mortality, Magnetohydrodynamics, Computers, Houses, Trailers, Cement, Hydrogen, Air conditioners.
Identifiers: Technical news bulletins, Metrication.

This monthly magazine features short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau management, and a listing of NBS publications. The table of contents for the current issue is: More on the Metric changeover; New insights on the causes of fire fatalities; Magnetohydrodynamics--an old idea with more power to it; You, the computer and our society in the next two decades; Mobile home safety, durability studies; Highlights; Bone 'cement' characterized; Major appliance manufacturers support energy efficiency program; Hydrogen fuel topics published; Check energy labels on room air conditioners.

JPRS-64770 PC$3.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Soviet-Bloc Research in Geophysics, Astronomy, and Space, No. 348.
15 May 75, 40p
Trans. from various journals.

Descriptors: *Geophysics, *Astronomy, *Space exploration, Upper atmosphere, Ionosphere, Venus atmosphere, Mars atmosphere, Clouds(Meteorology), Fog, Ocean bottom, Sea water, Seismic waves, Earth mantle, F region, Unmanned spacecraft, Scientific satellites, Translations, USSR.

The report contains translations and abstracts of articles on meteorology, oceanography, upper atmosphere and space research, astronomy and terrestrial geophysics, covering both science news and formal scientific reports. Published details of Soviet space spectaculars are included.

JPRS-64872 PC$3.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Soviet-Bloc Research in Geophysics, Astronomy, and Space. No. 349.
29 May 75, 26p
Trans. from various journals. See also No. 348, JPRS-64770.

Descriptors: *Geophysics, *Astronomy, *Space exploration, Earth atmosphere, Upper atmosphere, Ocean waves, Ocean currents, Earthquakes, Ocean bottom, Gravity anomalies, F region, Antarctic regions, Translations, USSR.

The report contains translations and abstracts of articles on meteorology, oceanography, upper atmosphere and space research, astronomy and terrestrial geophysics, covering both science news and formal scientific reports. Published details of Soviet space spectaculars are included.

JPRS-64967 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Keldysh Address on Academy of Sciences Anniversary,
M. V. Keldysh. 11 Jun 75, 11p
Trans. of mono. Sotsialisticheskaya Industriya, Moscow, 5 May 75, p1, 3.

Descriptors: *Research, *Meetings, *Universities, Translations, USSR.

The report contains a speech by USSR Academy of Sciences President M. V. Keldysh delivered before the Annual General Meeting of the Academy and Marking the 250th Anniversary of the Academy.

JPRS-65001 PC$3.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Soviet-Bloc Research in Geophysics, Astronomy, and Space, No. 350.
13 Jun 75, 49p
Trans. from various journals. See also No. 349, JPRS-64872.

Descriptors: *Geophysics, *Astronomy, *Space exploration, Upper atmosphere, Solar flares, Solar radio emission, Lunar atmosphere, Hail, Clouds(Meteorology), Ionosphere, Ocean waves, Oceanic crust, Earth crust, Magnetic storms, Mars atmosphere, Auroral zones, Gravimetric prospecting, Seismic waves, Arctic region, Scientific satellites, Translations, USSR.

The report contains translations and abstracts of articles on meteorology, oceanography, upper atmosphere and space research, astronomy and terrestrial geophysics, covering both science news and formal scientific reports. Published details of Soviet space spectaculars are included.

N75-23383/3GA PC$3.75/MF$2.25
Defence Scientific Information Service, Ottawa (Ontario).
A Subject Bibliography for Low Intensity Conflict.
R. B. Harvey, and G. W. R. Graves. Mar 75, 42p DSIS-TN-75-1

Descriptors: *Bibliographies, *Canada, *Disorders, *Violence, Information management, Information retrieval, Law (Jurisprudence), Libraries, Social factors, Subjects.

For abstract, see STAR 1314

N75-23384/1GA PC$5.25/MF$2.25
European Association of Scientific Information Dissemination Centres, the Hague (Netherlands).
The Future of CO-Operative Information Processing in Europe.
B. Battrick. Aug 74, 105p ESRO-SP-102
Conf-Proc. Of the European Assoc. Of Sci. Inform. Dissemination Centres Conf., Frascati, Italy, 6-8 Dec. 1973.

Descriptors: *Conferences, *Europe, *Information retrieval, *Information systems, *International cooperation, Chemistry, Computers, Economic factors, Sociology, Standardization, Technological forecasting.

For abstract, see STAR 1314

PB-242 071/9GA PC$5.25/MF$2.25
Virginia Energy Office, Richmond. Energy Information and Conservation Center.
Glossary of Energy Terminology,
Kathy Erickson, and Deborah Sherman. Mar 75, 119p* VEO-75/01

Descriptors: *Energy, *Dictionaries, Terminology, Definitions, Nomenclature.

The objective of the Glossary is to provide the public with a publication for quick reference to terms, conversion tables, and abbreviations used every day in the energy field.

PB-242 162/6GA PC$8.50/MF$2.25
Oklahoma State Univ., Stillwater. Center for Local Government Technology.
A Research Project to Develop a Design for a Technology Needs, Articulation and Aggregation System in Oklahoma.
Final rept.,
Joseph H. Mize. Aug 74, 262p NSF/RA/R-74-038
Grant NSF-DI-41031

Descriptors: *Information systems, *Technology utilization, Public administration, Rural areas, Technology transfer, Local government, Universities, Requirements, Problem solving, Services, Oklahoma.

The report describes a university-based program variation of the USDA Cooperative Extension Service model designed for the diffusion/dissemination of technology to small local governments in rural Oklahoma. This program would employ the county agricultural extension service to ascertain the technological needs of local governments and link those needs to the Center for Local Government Technology at Oklahoma State University. Thirteen major technological needs of small rural governments have been identified in such areas as manpower scheduling and equipment allocation, and 'solution packages' are being developed in cooperation with local officials. Solution packages are to contain detailed operating instructions, equipment specifications, manuals, and other features which would permit the immediate application of sophisticated management and engineering techniques by the relatively unskilled staffs of small rural governments.

PB-242 455/4GA PC$4.25/MF$2.25
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia).
CSIRO Index, Volume 1. 1975.
Jan 75, 52p ISSN-0311-5836
Index of CSIRO Published Papers and Translations.

Descriptors: *Research, *Australia, Animal husbandry, Chemistry, Physics, Construction,

Oceanography, Food, Fisheries, Land development, Mathematics, Minerals, Agriculture, Textiles.

Abstracts of papers in the following subject areas are included: Animal genetics, animal health, animal physiology, applied geomechanics, applied organic chemistry, atmospheric physics, australian numerical meteorology, building research, chemical engineering, chemical physics, chemical technology, cloud physics, entomology, fisheries and oceanography, food research, horticultural research, human nutrition, irrigation research, land resources management, land use research, mathematics and statistics, mineral chemistry, mineralogy, minerals research, national measurement, plant industry, protein chemistry, radiophysics, soils, solar energy, textile industry, textile physics, tribophysics, tropical agronomy, wildlife research.

PB-242 456/2GA PC$3.75/MF$2.25
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia).
CSIRO Index, Volume 1, Number 2, February 1975.
1975, 45p
Index of CSIRO published papers and translations.

Descriptors: *Research, *Australia, Animal husbandry, Chemistry, Physics, Environmental engineering, Oceanography, Food, Land development, Mathematics, Mechanical engineering, Minerals, Soils, Wildlife, Agriculture.

Abstracts of papers in the following subject areas are included: animal health, animal physiology, applied organic chemistry, building research, chemical physics, cloud physics, entomology, environmental mechanics, fisheries and oceanography, food research, horticultural research, human nutrition, irrigation research, land resources, land use marine biochemistry, mathematics and statistics, mechanical engineering, mineral chemistry, national measurement, plant industry, protein chemistry, radiophysics, soils, tribophysics, tropical agronomy, wheat research, wildlife research.

5C. Economics

AD-A011 279/7GA PC$4.25/MF$2.25
Massachusetts Inst of Tech Cambridge Operations Research Center
A Normative Methodology for Modeling Consumer Response to Innovation.
Technical rept.,
John R. Hauser, and Glen L. Urban. May 75, 74p Rept no. TR-109 ARO-9239.18-M
Contracts DAHC04-73-C-0032, AID/csd-3298

Descriptors: *Consumers, *Response, *Technology, *Reaction(Psychology), Industrial psychology, Utilization, Theory, Stochastic processes, Models, Operations research, Management engineering, Attitudes(Psychology).
Identifiers: *Technology innovation, *Consumer behavior.

After emphasizing the role of consumers in the success and failure of products and services, a methodology is proposed to improve the effectiveness of the creative design and strategic implementation of innovative new products and services. This methodology integrates knowledge in the fields of psychometrics, utility theory and stochastic choice modeling. The methodology consists of a consumer response and a managerial design process. The design process is one of idea generation, evaluation, and refinement while the consumer response is based on consumer measurement, models of the individual choice process, and aggregation of predictions of individual choices.

AD-A011 505/5GA PC$3.25/MF$2.25
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
A Theory of Money and Financial Institutions. Part 21. Fiat Money, Bank Money, the Float and the Money Rate of Interest,
Martin Shubik. 8 May 75, 20p Rept no. Discussion Paper-394
Contract N00014-67-A-0097-0011
See also Part 17, AD-774 498, and Part 23, AD-A011 506.

Descriptors: *Finance, *Money, *Economic models, Equilibrium(General), Commerce.
Identifiers: Fiat money, Interest rate of return, Utility functions, Prices.

In this paper it is shown that for any trading economy satisfying the conditions required to guarantee the existence of a competitive equilibrium price system there exist two associated trading economies one using bank money and the other using bank money and fiat money such that in the first competitive equilibrium is achieved with a zero rate of interest and in the second competitive equilibrium is achieved with a positive rate of interest. The fiat money issue is used to cover the float costlessly.

AD-A011 506/3GA PC$3.25/MF$2.25
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
A Theory of Money and Financial Institutions. Part 23. Fiat Money, Bank, Money, the Force of the Rate of Interest and the Vanishing Float,
Martin Shubik. 14 May 75, 12p Rept no. Discussion Paper-395
Contract N00014-67-A-0097-0011
See also Part 21, AD-A011 505.

Descriptors: *Money, *Finance, *Economic models, Commerce, Equilibrium(General).
Identifiers: Fiat money, Interest rate of return, Utility functions.

In two previous papers it was argued that the existence of a positive money rate of interest in a dynamic general equilibrium system depends upon the presence of two types of money in the system. These two types of money can be interpreted as fiat money issued by the government and bank money which is created and destroyed by the banking system. The previous models were formulated in terms of a discrete trading market with expenditures on trade and receipts of the goods taking place at the start of each period and receipt of income from the sale of goods obtained at the start of the next period. This formulation creates a one period 'float' of money which has been spent by the buyers but not received by the sellers. It was argued that in order to obtain a money rate of interest in conformity with our intuitive understanding of the relationship between a 'real' or 'natural' rate of interest it is necessary to issue at no interest change an amount of fiat money which precisely covers the float in the first period of trade. This paper is devoted to showing that this result still holds even if trade takes place continuously and hence even if the size of the float is apparently diminished.

COM-74-50944-18/GA
PC-GPO/MF$2.25-NTIS
Department of Commerce, Washington, D.C.
Commerce Today. Volume V, Number 18, June 9, 1975.
9 Jun 75, 43p
Paper copy available from GPO.

Descriptors: *Commerce, *Reviews, Food, Prices, Consumer price indexes, Market surveys, Statistical analysis, Technology transfer, Consumer products, Product safety, Energy conservation, Research.

Contents:
Large beef supply may ease upward pressure on consumer price index;
Government and business are working together to sharpen a marketing tool--statistics;
Consumer product safety act seen affecting business actions;
Incentive program pays technology bonus to American industry;
Energy management digest;
Domestic business report;
International commerce report.

COM-75-10129/GA
see prices of individual reports
International Customs Tariffs Bureau, Brussels (Belgium).
International Customs Journal. Year 1974-1975.
Bulletins.
1974-75,approx. 50 issues annually

The reports present authoritative information for exporters, importers, investors, manufacturers, and those concerned with international trade. They contain the schedules of duties and exemptions applicable to goods imported into or exported from the country. Order by individual numbers listed below:
Bull-14. European Economic Community (E.E.C.). 5th ed, Feb 75, 368p, PC$10.00/MF$2.25, supersedes COM-74-10483-014 **COM-75-10129-014/GA**
Bull-14. European Economic Community (E.E.C.). 5th ed, annex, 1975, 155p, PC$6.25/MF$2.25, annex to COM-75-10129-014 **COM-75-10129-014-ANX/GA**
Bull-021. United States of America. 13th ed, suppl-2, Dec 74, 5p, PC$3.25/MF$2.25, suppl to COM-74-10483-021 **COM-75-10129-021-2/GA**
Bull-29. New Zealand. 12th ed, Mar 75, 609p, PC$15.25/MF$2.25, supersedes 11th ed, COM-71-00584 **COM-75-10129-029/GA**
Bull-51. Libyan Arab Republic. 4th ed, Apr 75, 108p, PC$5.25/MF$2.25, supersedes 3rd ed, PB-185 692 **COM-75-10129-051/GA**
Bull-90. Colombia. 11th ed, Feb 75, 167p, PC$6.25/MF$2.25, supersedes PB-190 577 **COM-75-10129-090/GA**

COM-75-10742/5GA PC$3.75/MF$2.25
Administrative Sciences Corp., Alexandria, Va.
Development Patterns and Potentials of Selected Distressed Areas.
Final research rept.,
Henry L. Eskew. Mar 74, 33p ASC-R-106
EDA/OER-75-023
Contract C-4-45648

Descriptors: *Economic development, *Regional economic structure, *Economically depressed areas, Economic surveys, Economic potential, Regional development, Pattern recognition, Financial management, Income distribution, Hypotheses, Employment, Statistical data, Government economic policies, Financial assistance, Federal programs, Allocations, Substitutes.

The report covers a brief study to gain new insights into determining the extent to which individual areas exhibit genuine propects for economic recovery or development. This study builds on previous efforts by A. D. Little, Inc. (Economic Transition of Distressed Communities) in two respects. (1) Although different data sources, definition and methods are used, the same areas constitute the focal point for analysis and (2) the feasibility is examined of overcoming certain limitations of shift-share analysis discussed in the ADL report, with a view toward increasing its general usefulness in analyzing areal economic development potential. Full details of the design and implementation of the research are presented.

COM-75-10744/1GA PC$3.75/MF$2.25
National Bureau of Economic Research, Inc., New York.
Federalism, Tax-Transfer Substitutions and the Distribution of Income.
Research rept.,
Stephen P. Dresch. 27 Sep 71, 29p EDA/OER-75-012
Grant EDA-OER-396-G-71-17

Descriptors: *Income taxes, *Government policies, Recommendations, Tax credits, Revenue sharing, State taxes, Economic policy, Substitutes, Mathematical models, Income distribution.
Identifiers: Progressive credits, Alternatives, Policy changes.

As an alternative to general revenue sharing and to the existing system of Federal deductibility of State - local taxes, this paper proposes a system of progressive credits of State-local against Federal income taxes, and considers the consequences.

COM-75-10745/8GA PC$3.25/MF$2.25
Georgia Univ., Athens. Coll. of Business Administration.
Employment and Income Growth in the Southeast: Retrospect and Prospect.
Research rept.,
Charles F. Floyd. 1974, 24p EDA/OER-75-026

Descriptors: *Employment, *Income level, *Southeast Region(United States), Income distribution, Per capita income, Economic conditions, Census, Industries, Statistical data, Economic growth.

The study analyzes the reasons for the Southeast's continuing per capita income gap, documents recent trends in the Region's economic growth, and examines possible implications for the Southeast's future growth.

COM-75-10764/9GA PC$5.75/MF$2.25
National Maritime Research Center-Kings Point, N.Y.
Market Environment and Container System Productivity.
Final technical rept.,
J. R. McCaul. 1974, 146p* NMRC-KP-109

Descriptors: *Containerizing, *Cargo movements, *Marine transportation, Common carriers, Market surveys, Shipping containers, Unitizing, Costs, International trade, Commodity shipments.

The study examines the extent to which containerization has spread, both geographically and in terms of commodities moving in containers. Penetration by U.S. carriers in the container market is explored and load factors on major trade routes are estimated. The relationship between load factor and unit cost is investigated and conclusions derived as to the competitive abilities of U.S. container carriers. Among the conclusions reached in the study are: Containerized service in international trade has grown about 140% from 1969 through 1972, with varying growth patterns in different areas and varying penetration in different commodities; containerization has a relatively lower penetration in Southern and Gulf Coast States, reflecting a potential market opportunity.

COM-75-50068/GA PC-GPO
Bureau of International Commerce, Washington, D.C.
Foreign Economic Trends and Their Implications for the United States.
1975,147 issues
Paper copy available from GPO on subscription.

The series of reports presents current business and economic developments in every country that offers a present or potential market for United States goods. The reports include a summary of the prospective impact on the United States economy, changing trade patterns, prospective business trends, balance of payments, government policies, and investments. For individual country reports, order by COM-number listed below:

FET-75-036. Indonesia. Semiannual rept. Apr 75, 8p, supersedes ET-74-106 **COM-75-50068-036/GA**
FET-75-037. Kuwait. Annual rept. Apr 75, 8p, supersedes ET-74-038 **COM-75-50068-037/GA**
FET-75-041. Pakistan. Semiannual rept. May 75, 8p, supersedes ET-74-114 **COM-75-50068-041/GA**
FET-75-044. Korea. Semiannual rept. May 75, 8p, supersedes ET-74-129 **COM-75-50068-044/GA**
FET-75-045. Canada. Semiannual rept. May 75, 8p, supersedes ET-74-117 **COM-75-50068-045/GA**
FET-75-047. Greece. Semiannual rept. May 75, 8p, supersedes ET-74-116 **COM-75-50068-047/GA**
FET-75-048. Spain. Semiannual rept. May 75, 8p, supersedes ET-74-098 **COM-75-50068-048/GA**
FET-75-049. Laos. Annual rept. May 75, 8p, supersedes ET-74-047 **COM-75-50068-049/GA**
FET-75-050. Switzerland. Semiannual rept., May 75, 8p, supersedes ET-74-122 **COM-75-50068-050/GA**
FET-75-051. Thailand. Semiannual rept. May 75, 8p, supersedes ET-74-111 **COM-75-50068-051/GA**
FET-75-052. Mexico. Semiannual rept. Jun 75, 8p, supersedes ET-74-119 **COM-75-50068-052/GA**
FET-75-058. Finland. Semiannual rept. Jun 75, 8p, supersedes ET-73-142 **COM-75-50068-058/GA**
FET-75-061. Ecuador. Annual rept. Jun 75, 8p, supersedes ET-74-016 **COM-75-50068-061/GA**
FET-75-062. Ireland. Semiannual rept. Jun 75, 7p, supersedes ET-74-133 **COM-75-50068-062/GA**
FET-75-063. Italy. Semiannual rept. Jun 75, 8p, supersedes ET-74-120 **COM-75-50068-063/GA**
FET-75-064. Philippines. Semiannual rept. Jun 75, 8p, supersedes ET-74-140 **COM-75-50068-064/GA**
FET-75-065. Turkey. Semiannual rept. Jun 75, 8p, supersedes ET-74-143 **COM-75-50068-065/GA**
FET-75-066. United Kingdom. Semiannual rept. Jun 75, 8p, supersedes ET-75-017 **COM-75-50068-066/GA**
FET-75-067. Ivory Coast. Annual rept. Jun 75, 8p, supersedes ET-74-034 **COM-75-50068-067/GA**
FET-75-068. Federal Republic of Germany. Semiannual rept. Jun 75, 8p, supersedes ET-74-131 **COM-75-50068-068/GA**
FET-75-070. Uruguay. Semiannual rept. Jun 75, 8p, supersedes ET-74-108 **COM-75-50068-070/GA**

COM-75-50158-05/GA PC-GPO/MF$2.25-NTIS
Bureau of Economic Analysis, Washington, D.C.
Survey of Current Business. Volume 55, Number 5, May 1975.
Monthly periodical rept.
May 75, 68p
Paper copy available from GPO including weekly statistical supplement. Microfiche also available from NTIS $30.00/year, (excluding weekly supplement).

Descriptors: *Current business, *Business surveys, *Periodicals, Gross national product, Price surveys, National income and product, Industries, Input output models, Government expenditures, Grants in aid, Government spending, Purchasing.

Contents:
Revised first quarter GNP;
Price developments;
National Income and Product Tables;
Industry effects of government expenditures--an input-output analysis;
Industry effects of government transfer payments to persons and of grants-in-aid, 1963 and 1972;
Industry outputs attributable to government purchases and to other purchases of GNP financed by Government, 1963.
Color illustrations reproduced in black and white.

COM-75-50361-01/GA PC-GPO/MF$2.25-NTIS/copy
Bureau of Domestic Commerce, Washington, D.C.
Printing and Publishing. Volume 16, Number 1, January 1975.
Quarterly industry rept.
Jan 75, 23p
Paper copy available from GPO on subscription.

Descriptors: *Industry surveys, *Printing and publishing, Foreign trade, Books, Periodicals, Printing plates.

Contents:
No recession seen in U.S. foreign trade in books;
Greeting card growth reflects changing market;
U.S. exports of books, periodicals, other printed matter, loose-leaf binders, and printing plates, January-September 1974;
U.S. exports of books, periodicals, other printed matter, loose-leaf binders, and printing plates, by principal markets, January-September 1974;
U.S. imports of books, periodicals, other printed matter, and printing plates, January-September 1974;
U.S. imports of books, periodicals, other printed matter, and printing plates, by principal suppliers, January-September 1974;
Selected U.S. statistics--printing, publishing, and allied industries, annual average 1972, and 1973-74 by quarters.

COM-75-50390/4GA PC-GPO/MF$2.25-NTIS
Office of Business Research and Analysis, Washington, D.C.
Department Store Retailing in an Era of Change,
Marvin J. Margulies. Jun 75, 39p
Paper copy available from GPO.

Descriptors: *Department stores, *Retailing, Retail sales, Department store sales, Consumer education, Employment, Sales management, Services, Discount trade, Discount chain stores, Merchandizing techniques.

Contents:
Sales trends and structural changes in the department store field;
Changing life styles and their effect on department store retailing;
Increasing productivity in the department store;
Additional opportunities using existing facilities and management;
Non-retail sales opportunities;
The discount department store;
The advent of the specialty shop;
Outlook for U.S. department stores abroad.

COM-75-50391/2GA PC-GPO/MF$2.25-NTIS
Bureau of International Commerce, Washington, D.C. Office of International Marketing.
Global Market Survey: Avionics and Aviation Support Equipment.
May 75, 190p
Paper copy available from GPO.

Descriptors: *Global market surveys, *Avionics, Market research, World market, Export opportunities, Australia, Brazil, France, Germany, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, Singapore, Sweden, Switzerland, United Kingdom, Argentina, Ethiopia, Nigeria, Spain, Turkey, Yugoslavia.

The Global Market Survey is intended to serve as an export sales planning tool for marketing decision makers of American companies engaged in the manufacture of avionics and aviation support equipment. It is a ready desk reference of facts and figures on the country markets researched and identifies the best U.S. export sales opportunities in each market on a product-by-product basis. This Survey is one in a series of Bureau of International Commerce publications focusing on overseas marketing opportunities for U.S. suppliers in selected industries.

COM-75-50392/0GA PC-GPO/MF$2.25-NTIS
Economic Development Administration, Washington, D.C.
1974 Annual Report, Economic Development Administration.
31 Dec 74, 94p
Paper copy available from GPO.

Descriptors: *Economic development, Technical assistance programs, Technology transfer, Public works, Industrial growth, Manpower utilization, Business counseling, Low income groups, Employment, Projects, Community development.
Identifiers: Job creation.

In fiscal 1974, EDA financial tools consisted of public works grants and loans, business development loans and working capital guarantees, planning grants, and technical assistance. The agency also conducted research into the causes of unemployment, underemployment, underdevelopment, and chronic depression in various areas and regions of the Nation. The agency's public works program provided funds for a wide variety of projects in support of local efforts to create permanent, full-time jobs. Grants also were made to enable communities to build facilities to help create immediate jobs under the Public Works Impact Program (PWIP). Primarily through its technical assistance program, EDA demonstrated its flexibility in meeting the special needs of communities facing job losses and economic dislocations in connection with the curtailment of defense activities. EDA modified and strengthened its assistance to the Nation's Indian reservations and continued to encourage cooperation between various levels of government for long-range planning and investments to stimulate orderly growth.

COM-75-50944-19/GA PC-GPO/MF$2.25-NTIS
Department of Commerce, Washington, D.C.
Commerce Today. Volume V, Number 19, June 23, 1975.
23 Jun 75, 43p
Paper copy available from GPO.

Descriptors: *Commerce, *Reviews, Fighter aircraft, Trade shows, Environmental issues, Energy conservation, Research, Raw materials.

Contents:
Swings in oil mask foreign trade patterns;
Dramatic F-16 purchase leads way to U.S. success at Paris air show;
Should environmental protection stand aside for economic health;
Industry's raw material supplies affected by import dependence;
Energy management digest;
International commerce report. Color illustrations reproduced in black and white.

NTIS/PS-75/567/8GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Wages, Salaries, and Earnings. Volume 2. 1974-May 75 (A Bibliography with Abstracts).
Rept. for 1974-May 75,
Mary E. Young. Jul 75, 69p*
See also Volume 1, NTIS/PS-75/568.

Descriptors: *Salaries, *Bibliographies, *Labor force, Earnings, Employment, Skilled workers, Unskilled workers, Professional personnel, Background, Minorities, Females, Mobility, Education, Upgrading, Discrimination, Productivity, Personnel development, Economic analysis, Manpower.

Studies of employee compensation in the United States are abstracted in the bibliography. Included are reports on the effects of education, age, and health on earnings, the impact of labor unions, fringe benefits, problems of the disadvantaged and minorities, and statistics for specific industries. (Contains 64 abstracts). See also NTIS/PS-75/568, Wages, Salaries, and Earnings. Vol. 1. 1964-1974.

NTIS/PS-75/568/6GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Wages, Salaries, and Earnings. Volume 1. 1964-1973 (A Bibliography with Abstracts).
Rept. for 1964-1973,
Mary E. Young. Jul 75, 173p*
See also Volume 2, NTIS/PS-75/567.

Descriptors: *Salaries, *Bibliographies, *Labor force, Earnings, Employment, Skilled workers, Unskilled workers, Professional personnel, Background, Minorities, Females, Mobility, Education, Upgrading, Discrimination, Productivity, Personnel development, Economic analysis, Manpower.

Studies of employee compensation in the United States are abstracted in the bibliography. Included are reports on the effects of education, age, and health on earnings, the impact of labor unions, fringe benefits, problems of the disadvantaged and minorities, and statistics for specific industries. (Contains 158 abstracts). See also NTIS/PS-75/567, Wages, Salaries, and Earnings Vol. 2. 1974-May, 1975.

PB-242 153/5GA PC$5.25/MF$2.25
Martin Marietta Labs., Baltimore, Md.
Study to Determine the Feasibility of an Experiment to Transfer Technology to the Crushed Stone Industry.
Final rept.,
M. A. Ozol, S. R. Locke, J. Gray, R. E. Jackson, and A. Preis. Jun 74, 122p MML-TR-74-26c NSF/RA/R-74-040
Grant NSF-C826

Descriptors: *Technology transfer, *Stone construction, *Industries, Productivity increase, Feasibility, Mining engineering, Environmental issues, Land use zoning, Barriers, Recommendations, Rock crushers.
Identifiers: *Crushed stone industry.

The report presents the results of a study of the crushed stone industry in the U.S. It examines advanced technology that might be applied to improving the industry's productivity, describes mechanisms for transferring technology to the industry, and outlines plans for an appropriate technology transfer experiment. The study includes a review of the literature on crushed stone and related mining and mineral technology, interviews with crushed stone operators, and visits to various laboratories, it provides an assessment of the National Crushed Stone Association as a technology transfer agent. The results of the study point to environmental, zoning, and related problems as potential barriers to future productivity, and emphasize technological solutions that would permit higher levels of productivity without compromising environmental quality.

PB-242 163/4GA PC$3.75/MF$2.25
Rubell (S. M.) and Associates, Chicago, Ill.
Venture Capital: A Larger Role in Innovation.
Final rept.,
Stanley M. Rubell, and Brian Haslett. Dec 72, 49p NSF/RA/R-72-022

Descriptors: *Venture capital, *Technology innovation, *Investment incentives.

The report identifies the role that venture capital plays in the formation, development, and continuing expansion of technology-based companies, the structure of the venture capital community, and some broad guidelines for federal incentives which might release more capital into the technological innovation process. One of the specific problems defined by the report was the lack of understanding by the technologist of the venture capital community. The broad education of the technologist to the factors which influence and control the venture capital investment community was recommended as a general strategy to address this problem.

PB-242 195/6GA PC$6.25/MF$2.25
Texas Univ. at Austin. Graduate School of Business.
The Role of Insurance Companies in the Venture Capital Investment Process: A Background Study of Barriers and Incentives.
Final rept.,
Richard M. Harmon. May 74, 169p* NSF/RA/R-74-023, NSF/RDI-23

Descriptors: *Venture capital, *Insurance companies, *Investment outlook, Investment incentives, Barriers, Capital investments, Economic characteristics, New technology, Entrepreneurship, Capital gains, Risk, Return on investment.
Identifiers: High risk investments, Legal aspects.

The report is an examination of a set of life, casualty, and multi-line insurance companies with respect to their roles in the field of venture capital. It further discusses the barriers and incentives that occur with respect to these roles in an economic, legal and managerial context. The study describes methods used by insurance companies for entering into venture capital investing; it delineates the propensities of companies to so invest by their type, size, and geographical location; describes the evaluation and selection criteria used by insurance companies in such investing; analyzes investments with regard to sources of information, amounts invested, pay-out period, level of participation, return on investment, and types of industries; and finally it draws conclusions and provides a future perspective on the role of insurance companies in venture capital.

PB-242 213/7GA PC$3.75/MF$2.25
Marcom Applied Systems, Inc., Sherman Oaks, Calif.

A Functional Approach for the RANN Industrial Automation Program, Volume I: Executive Summary,
Thomas G. Patterson. Aug 73, 40p MAS-C774-Vol-1 NSF/RA/T-73-076
Grant NSF-C774
Paper copy also available in set of 3 reports as PB-242 212-SET, PC$19.00. See also Volume 2, PB-242 214.

Descriptors: *Technology development, *Industrial surveys, Mass production, Batching, Business organizations, Industries, Problem solving, Facilities, Profit analysis, Return on investment, Criteria, Optimization, Environmental issues, Computer technology, Skilled workers, Labor relations, Constraints, Productivity, Automation.
Identifiers: Process development.

The results of a study of 18 segments of American industry to determine where and how important gains in effectiveness through technology might be attained are presented. The industrial segments studied varied from basic materials to heavy industry to soft goods manufacturing to service type enterprises. They included both mass production and 'batch' operations and ranged from very large to very small companies. The study probed not only the problem areas but also the reasons for them and possible technological solutions to the problems. In volume one of three volumes, the list of problem areas was analyzed in order to reveal any significant factors relating to the type of process, size of industry, and commonality to different industries. Serious production problem areas were identified as leverage points. The methods of analysis were refined during the study, and the results demonstrate that it is feasible to use these methods to pinpoint problem areas in production.

PB-242 214/5GA PC$10.25/MF$2.25
Marcom Applied Systems, Inc., Sherman Oaks, Calif.
A Functional Approach for the RANN Industrial Automation Program. Volume II: Study Report,
Thomas G. Patterson. Aug 73, 395p MAS-C774-Vol-2 NSF/RA/T-73-077
Grant NSF-C774
Paper copy also available in set of 3 reports as PB-242 212-SET, PC$19.00. See also Volume 1, PB-242 213, and Volume 3, PB-242 215.

Descriptors: *Technology development, *Industrial surveys, Production increases, Industrial development, Iron and steel industry, Automotive industry, Shipbuilding industry, Electric housewares, Textile industry, Electric machinery, Electronics, Machine tool industry, Hospitals, Productivity, Recommendations, Leadership, Automation, Color television, Computer components, Metal working.
Identifiers: Laundry equipment, Bottleneck problems.

Volume 2 of a three volume report on technology development presents data from the study of leverage points, i.e. points at which technology could make important contributions to increased production in various industries. A Detailed description of each leverage point classified by industry segment, function, and subfunction; a description of the work task; and the reasons why the work task is considered to be important are presented. The industrial segments studied were iron and steel, automotive, shipbuilding, household appliances, textiles, electrical machinery, electronic equipment, machine tools, and hospitals. The findings of the study are presented in some detail, and it is concluded that industry on-its-own cannot be expected to employ technology at the bottlenecks to improve productivity. The leadership necessary for the improvement resulting from automation must come from research.

PB-242 215/2GA PC$7.50/MF$2.25
Marcom Applied Systems, Inc., Sherman Oaks, Calif.
A Functional Approach for the RANN Industrial Automation Program. Volume III: Appendix Report,
Thomas G. Patterson. Aug 73, 229p MAS-C774-Vol-3 NSF/RA/T-73-078
Grant NSF-C774
Paper copy also available in set of 3 reports as PB-242 212-SET, PC$19.00. See also Volume 2, PB-242 214.

Descriptors: *Technology development, *Industrial surveys, Information systems, Industrial development, Automation, Definitions, Data acquisition, Site surveys, Industries, Classifications, Management methods, Quality assurance, Industrial productivity, Planning, Flow charting, Manufacturers, Statistical analysis, Mathematical models, Computer technology, Interviews.
Identifiers: Diagnostic methods.

This document constitutes the third part of the report of the NSF study of different segments of the American industry to determine where and how important gains in effectiveness through technology might be attained. Sections are included on supporting information, definitions, sources of information, and site research results for the study.

PB-242 254/1GA PC$4.75/MF$2.25
Peat, Marwick, Mitchell and Co., Washington, D.C.
R and D Incentives Study. Volume I. Project Description.
Final rept.,
Allan Taub. Apr 74, 85p NSF/RA/R-74/013A-Vol-1
Contract NSF-C825
See also PB-242 255.

Descriptors: *Balance of trade, *Research and development, *Government policies, Tax structure, Budgeting, Industrial surveys, Incentives, Technological development, Inequalities, Criteria, Methodology, Competition, Europe, Far East, United States, International trade.
Identifiers: Alternatives.

The report addresses the worsening balance of trade between the United States and the rest of the world, which has been felt by some in government and industry to be at least partly due to a technological imbalance in certain United States industries vis-a-vis their competitors in Europe and the Far East. A study was initiated to investigate the effects of federal tax policies on private investments in research and development (R&D). The advantages of providing incentives to private investment in R&D through alternative federal tax policies were examined, and potential experimental programs were developed to test those policies. Six tax policies were developed and six candidate industries selected on which to test the effect of the alternative policies relative to R&D budgeting. A survey was conducted using these six policies with the selected industries to determine whether R&D investment could be stimulated by one or more changes in federal tax policy. Volume I of this report describes the criteria and methodologies by which the tax policies were formulated and the industries selected.

PB-242 255/8GA PC$3.75/MF$2.25
Peat, Marwick, Mitchell and Co., Washington, D.C.
R and D Incentives Study. Volume II. Experimental Program Concept and Design.
Final rept.,
Allan Taub. Apr 74, 50p NSF/RA/R-74/013B-Vol-2
Contract NSF-C825
See also PB-242 254.

Descriptors: *Balance of trade, *Research and development, *Government policies, Federal programs, Incentives, Tax structure, Industries, Econometric models, Experimental design, Simulation, Economic impacts, Decision making, Productivity, Quality of life, Economic indicators.
Identifiers: Alternatives.

In a study initiated to investigate the effects of federal tax policies on private investments in research and development, the advantages of providing incentives through alternative policies were examined. Six tax policies were developed and six candidate industries were selected on which to test their effects. Volume 2 of a two volume report describes the concept and design of an experimental program within which the alternative tax policies might be tested.

PB-242 267/3GA PC$3.25/MF$2.25
Oregon Univ., Eugene. Coll. of Business Administration.
Experimental Center for the Advancement of Invention and Innovation. Phase 1.
Annual rept. no. 1 (Final),
Gerald G. Udell. Jun 74, 19p NSF/RA/R-74-012
Grant NSF-CG-00001

Descriptors: *Technology innovation, *Incentives, Business education, Universities, Students, Inventions, Entrepreneurship, Venture research, Services, National government.

The report summarizes the activities of the Center for Innovation and Invention at the University of Oregon during its initial year of operation under NSF funding. This center was one of three established--CMU; MIT; and the University of Oregon--as an experiment to test the effectiveness of government sponsored innovation centers on influencing the career choice of students towards entrepreneurship and innovation, and ultimately in stimulating increased technological innovation and new enterprise formation. The report describes procedures for (1) establishing the center within a university framework; (2) developing curriculum and staff; (3) establishing legal requirements; (4) eliciting student and community response; and (5) selecting, evaluating and developing new products and services and new enterprises as classroom and laboratory activities. During the first year of operation over 500 new products were evaluated. Over 300 students and 12 faculty members were involved in center activities and several new enterprises were formed.

PB-242 322/6GA PC$6.25/MF$2.25
Rhode Island Univ., Kingston, International Center for Marine Resource Development.
Puerto Rico Fisheries-Mariculture Development Project.
Final rept.,
Kenneth W. Watters. Sep 74, 167p NSF/RA/R-74/039
Grant NSF-DI-39552

Descriptors: *Fisheries, *Aquaculture, *Puerto Rico, Fishing equipment, Socioeconomic conditions, Shellfish, Marine fishes, Fishing, Fish harvesting, Fishing grounds, Oysters, Loans, Attitudes.
Identifiers: Crassostrea rhizophorae.

The report describes the Puerto Rico fisheries industry and a series of potential experiments with pre-selected, innovative technologies considered most likely to result in significantly increased yields of fisheries and mariculture products in the near future. It identifies barriers to technological development in the environment studied, and the main sources of opportunity in Puerto Rico for overcoming them. Portions of this document are not fully legible.

PB-242 337/4GA PC$4.75/MF$2.25
Leibowitz (Arnold H.), Washington, D.C.
Government Policy and Innovation: The Small Business Administration Experience.
Final rept.,
Arnold Leibowitz. Dec 74, 94p NSF/RA/R-74-065
Grant NSF-DI-40778

Descriptors: *Small business assistance, *Federal assistance programs, *Economic surveys, Financial assistance, Technology innovation, Industrial research and development, Small business loans, Contract awards, Investment incentives, Information systems, National government, Government policies, Public administration.

The report is a comprehensive review of the development of the SBA from its beginnings in 1953 to the present, with a special emphasis on its support of technological innovation. Such support has included: (1) financial assistance in the form of direct loans, guaranteed loans, and indirect loan assistance through small business investment corporations; (2) efforts to assist small R&D firms in obtaining government contracts; and (3) a technological information program, begun in 1968, concerning developments in R&D. These activities are evaluated in detail and specific recommendations are made for further studies.

PB-242 392/9GA PC$7.00/MF$2.25
Decision Sciences Corp., Jenkintown, Pa.
Housing Data for Modular Integrated Utility System Economic Analysis. Volume I.
Final rept.,
Donald R. Glenn. May 74, 198p HUD-DSC-3-Vol-1
Contract HUD-H-1776
See also PB-242 393.

Descriptors: *Housing market, *Construction industry, *New construction, Residential buildings, High rise apartments, Standard metropolitan statistical areas, Construction statistics, Marketing, Housing characteristics.
Identifiers: Multifamily housing, Condominiums, MIUS(Modular Integrated Utility Systems), Modular integrated utility systems.

The study examines the multifamily housing construction industry. Emphasis is placed on the present market and the growth pattern displayed during the last 5 years, when this industry experienced its greatest advance. During this period, the multifamily construction market share increased from 40% to almost 54% of total new housing. The final report is presented in 3 volumes. This volume, consists of three sections and the Executive summary. Section II presents a detailed analysis of the various physical and marketing aspects influencing the multifamily housing industry. Section III documents the in-depth study conducted in Atlanta, and Philadelphia. Topics included in this investigation were site selection criteria, construction phasing and scheduling, historical background, and future trends anticipated in each region.

PB-242 393/7GA PC$7.50/MF$2.25
Decision Science Corp., Jenkintown, Pa.
Housing Data for Modular Integrated Utility System Economic Analysis. Volume II.
Final rept.,
Donald R. Glenn. May 74, 236p HUD-DSC-3-Vol-2
Contract HUD-H-1776
See also PB-242 392.

Descriptors: *Housing market, *Construction industry, *New construction, Residential buildings, High rise apartments, Standard metropolitan statistical areas, Construction statistics, Unit costs, Value engineering, Housing census, Geographic divisions.
Identifiers: Multifamily housing, MIUS(Modular Integrated Utility Systems), Modular integrated utility systems.

The study examines the multifamily housing construction industry. Emphasis is placed on the present market and the growth patterns displayed during the last 5 years, when this industry experienced its greatest advance. During this period, the multifamily construction market share increased from 40% to almost 54% of total new housing. The final report is presented in 3 volumes. This volume, presents the multifamily project characteristics including average number of buildings/project, number of living units and stories/building, cost/square foot as a function of number of stories/building and other financial relationships relative to land use as well as average living unit size/project. These averages are compiled by Census Region and by climatic regions defined by cooling degree day isopleths starting at 500 and increasing in increments of 500 to 4500, resulting in 10 zones. The 46 SMSA's leading the nation in multifamily housing construction are overlaid onto the climatic zones.

PB-242 592/4GA PC$7.00/MF$2.25
Forecasting International Ltd., Arlington, Va.
A Study to Identify Measures to Stimulate the Dayton Regional Economy Through Technology Utilization and Summary of Results.
Final rept.,
Kathryn H. Humes, John Cordrey, and Earl Sterzer. Oct 74, 192p NSF/RA/R-74-055
Grant NSF-DI-39500
Sponsored in part by Department of Housing and Urban Development, Washington, D.C.

Descriptors: *Technology utilization, *Economic development, *Urban development, Local government, Management methods, Incentives, Barriers, Regional economic structure, Ohio.
Identifiers: *Dayton(Ohio).

The report summarizes research performed for the city of Dayton to identify actions and strategies which could be undertaken at all levels of local government and industry to encourage technology utilization and economic development in the regional economy. To identify these strategies the study has attempted to develop and test a methodology applicable to any regional economy, to describe the present and projected economic and technological bases of Dayton, and to identify opportunities for, and barriers to, economic development in Dayton.

PB-242 718/5GA PC$4.25/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Economic Analysis Section.
Coordination, Competition, and Regulation in the Electric Utility Industry,
Vid W. Penn, James B. Delaney, and T. Crawford Honeycutt. Jun 75, 55p* NUREG-75/061

Descriptors: *Electric utilities, Regulations, Competition, Coordination, Management, Economic analysis, Industries.

An investigation of the interrelated roles played by competition, coordinaton and regulation in the electric utility industry has been prepared by the Office of Antitrust and Indemnity of the Nuclear Regulatory Commission. The effect of coordinated planning and facilities on competition is contrasted with the effect on competition of the holding company or other forms of industry consolidation. Finally, the role of regulation, as it affects both coordination and competition, is discussed. The authors conclude that competition and coordination in the electric utility industry are compatible with one another, and that regulation should be aimed at encouraging opportunities for both.

5D. History, Law, and Political Science

COM-75-10720/1GA PC$4.75
Spessard L. Holland Law Center, Gainesville, Fla.
The Use and Legal Significance of the Mean High Water Line in Coastal Boundary Mapping,
Frank E. Maloney, and Richard C. Ausness. Dec 74, 90p NOAA-75051405
Grant NOAA-04-3-158-43
Sponsored in part by Florida Dept. of Natural Resources, Tallahassee. Prepared in cooperation with Kentucky Univ., Lexington. Pub. in The North Carolina Law Review, v53 n2 p185-273 Dec 74.

Descriptors: *Water rights, *Water law, *Coastal zone management, Boundaries, Ocean tides, Common law, Mapping, Legislation.
Identifiers: Sea Grant Program.

Determination of coastal boundaries is essential to the development of an effective coastal zone management program. This article examines a number of physical and legal problems associated with coastal boundary determinations and offers some solutions within the framework of the legislative proposal which accompanies the discussion.

COM-75-10748/2GA PC$3.75
Georgia Univ., Athens.
Public Rights in Georgia's Tidelands,
J. Owens Smith, and Jack L. Sammons. 1974, 38p NOAA-75052014
Grants NOAA-1-36009, NOAA-04-3-158-6
Pub. in Georgia Law Review, v9 n1 p79-114 Fall 1974.

Descriptors: *Swamps, *Water law, *Coasts, Boundaries, Real property, State government, Regulations, Legislation, Intertidal zone, Common law, Interpretation, Georgia.
Identifiers: *Tidelands, Marshes, Sea Grant program.

The importance of coastal marshlands and other intertidal areas to both commercial and environmental interests precludes application of traditional concepts of private property ownership to their use. Although the necessity for state regulation has been established and to some extent implemented, the theoretical basis for such regulation is highly determinative of its effectiveness in protecting the interests of the public. The article traces the confusing evolution of the public trust doctrine and establishes that proper interpretation of Georgia law in this area requires that the role of the state be controlled by the public trust doctrine.

JPRS-L/5105 PC$3.25
Joint Publications Research Service, Arlington, Va.
Translations on South and East Asia, (GUO 61/74).
18 Nov 74, 18p
Trans. from various journals. Paper copy available to U.S. Government recipients only.

Descriptors: *Political science, *Economics, *Japan, Translations.

Contents:
- Japan anxious about possible decrease in American grain exports;
- Japanese aid to African countries found to be less than efficient;
- Japanese firms active in Peruvian oil exploration;
- Japanese steel exports to Southeast Asia falling off;
- Japanese delegation will negotiate for raw coal in North Korea.

JPRS-L/5106 PC$3.75
Joint Publications Research Service, Arlington, Va.
Translations on Western Europe. (GUO 10/74).
19 Nov 74, 26p
Trans. from various journals. Paper copy available to U.S. Government recipients only.

Descriptors: *Political science, *France, *Communism, Translations.

Contents:
Book recounts workings of French Communist party;
New book provides insights into PCF leader marchais.

PB-241 899/4GA PC$3.25/MF$2.25
National Clearinghouse on Offender Employment Restrictions, Washington, D.C.
Guide to Legislative Action: A Review of Strategies to Remove Statutory Restrictions on Offender Job Opportunities,
James W. Hunt, and James E. Bowers. Jan 75, 19p DLMA-82-11-72-02-01
Contract DL-82-11-72-02

Descriptors: *Employment, *Barriers, *Legislation, Removal, Manpower utilization, Government policies, Job opportunities, Methodology, Florida, Washington(State), California, Connecticut, Program review, Statutes.
Identifiers: *Offenders, *Exoffender employment, Legal restrictions.

A review is made of different strategies that have been used successfully in obtaining removal of statutory barriers to offender employment. The report may be useful as a guide to others on how to proceed.

PB-241 906/7GA PC$4.75/MF$2.25
National Clearinghouse on Offender Employment Restrictions, Washington, D.C.
Laws, Licenses and the Offender's Right to Work. A Study of State Laws Restricting the Occupational Licensing of Former Offenders,
James W. Hunt, James E. Bowers, and Neal Miller. 1974, 81p* DLMA-82-11-72-02-02
Contract DL-82-11-72-02

Descriptors: *Employment, *Barriers, *State legislation, Licenses, Job opportunities, Manpower utilization, Surveys, Occupations, Crimes, Criminology, Ethics, Standards, Theories, Statutes.
Identifiers: *Exoffender employment, Civil rights, Morals.

A definition is presented of licensing and licensing standards and restrictions. The report contains a compendium of all occupations with licensing restrictions for offenders, for all states, with suggestions for legislation, court action, or attorney general decisions.

PB-242 586/6GA PC$4.25/MF$2.25
Rochester Univ., N.Y. Graduate School of Management.
Rochester-Monroe County Criminal Justice Pilot City Program. Phase 1.
Final rept. 2 Jun 72-31 Dec 73,
Elizabeth Benz Croft. 31 Dec 73, 62p
Grant LEAA-72-NI-02-0001
See also report dated 31 Dec 72, PB-223 422 and PB-242 587.

Descriptors: *Criminal justice, Pilot projects, Criminal law, Criminology, Improvement, Reviews, Evaluation, Personnel, Data processing, Universities, Objectives, Effectiveness, Urban planning, Policies, Coordination, Organizations, New York.
Identifiers: Rochester(New York), Monroe County(New York).

The Pilot City Program is designed as a long-range research and development program. Its overall goals include reduction of crime and delinquency, upgrading of the Criminal Justice System and improvement in the quality of justice. To meet these goals, the program began working in three areas-Pilot Research of Criminal Justice Systems Problems, Technical Assistance to Criminal Justice Agencies, and the development 'Model' Demonstration Projects in the Community. Mechanisms were also developed for coordinating the Pilot City Program with other local, state, and Federal Criminal Justice Planning Activities.

PB-242 587/4GA PC$4.25/MF$2.25
Rochester Univ., N.Y. Graduate School of Management.
Rochester-Monroe County Criminal Justice Pilot City Program. Phase 2.
Interim rept. 2 Jun 72-31 Dec 73,
Elizabeth Benz Croft. 30 Sep 74, 59p
Grant LEAA-74-NI-02-0002
See also PB-242 586.

Descriptors: *Criminal justice, Pilot projects, Criminal law, Criminology, Improvement, Research projects, Technical assistance, Universities, Urban planning, Evaluation, Policies, Organizations, New York.
Identifiers: Rochester(New York), Monroe County(New York).

The report describes research activities, responses to requests for technical assistance, and the development of demonstration projects undertaken as part of Rochester's Pilot City Program. Research Activities involved developing quantitative baseline data on the Criminal Justice System, undertaking in-depth studies in specific areas, and conducting short but intensive research surveys relative to the development of demonstration projects. Technical assistance covers such activities as rendering general advice, providing some consulting services, serving on study committees, and undertaking intensive analysis of specific problems and dveloping problem-solving alternatives. Three new demonstration projects were developed in this phase, and time was spent working on five projects carried over from Phase one.

5E. Human Factors Engineering

AD-A011 261/5GA PC$3.75/MF$2.25
Edgewood Arsenal Aberdeen Proving Ground Md
Respiratory Resistance and the Endurance of Men Working under Thermal Stress.
Technical rept. Dec 73-Jul 74,
Francis N. Craig, and Fred W. Stemler. May 75, 30p Rept no. EB-TR-75025

Descriptors: *Protective masks, *Heat stress(Physiology), *Endurance(Physiology), *Respiration, Humans, Physiological effects, Body temperature, Stress(Physiology), Oxygen consumption, Breathing apparatus, Heart, Military personnel, Experimental data, Human factors engineering.

The effect of the respiratory resistances of the M17A1 protective mask on endurance in hard work of five men wearing the two-layer permeable protective assembly was tested by comparing the standard mask with one whose inspiratory and expiratory resistances were 3 mm H2O at an airflow of 85 liters per minute. Four comparisons were made at 18C, nine at 41C, and three at 46C in walking at 3 mph or jogging at 4 mph, both up a 10 percent grade. The 3-mph walks represented a workload of from one-third to one-half the measured maximal oxygen uptake. The physiological state at exhaustion was examined in terms of the heart rate, rectal temperature, and the time devoted to the expiratory phase of the respiratory cycle. For men walking at 3 mph up a 10 percent grade, the heat load of the permeable protective assembly restricts endurance at environmental temperatures of 18C and above. The respiratory stress of the M17A1 protective mask does not add significantly to the restriction on endurance under these conditions.

AD-A011 537/8GA PC$4.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Designing for Muscular Strength of Various Populations.
Final rept.,
K. H. Eberhard Kroemer. Dec 74, 58p Rept no. AMRL-TR-72-46

Descriptors: *Biomechanics, *Strength(Physiology), *Human factors engineering, *Man machine systems, Muscles, Operators(Personnel), Experimental data, Anthropometry, Physiology, Endurance(Physiology).

Hand- and foot-operated controls are the input devices through which the operator effects the performance of manned systems. Selection of the type of control and its location within the reach envelope depend, to a large degree, on biomechanical parameters of all user populations, i.e., mainly on their body dimensions and on their strength characteristics, including motion stereotypes and lateral preferences. Muscular strength for control operation can vary significantly with age, sex, cultural origin, health, training, motivation, and other specific traits of the operator population. The paper discusses several of these variables and their biomechanical implications, and describes techniques and a regimen to design new equipment or modify existing equipment to conform to the strength characteristics of the operator populations.

AD-A011 580/8GA PC$3.25/MF$2.25
Webb Associates Inc Yellow Springs Ohio
The Effects of Personal Protective Equipment Upon the Arm-Reach Capability of USAF Pilots,
Milton Alexander, and Lloyd Laubach. Jul 73, 10p AMRL-TR-72-93
Contract F33615-72-C-1006
Pub. in Proceedings of the Interagency Conference on Management and Technology in the Crew System Design Process, Los Angeles, on 12-14 September 1972.

Descriptors: *Human factors engineering, *Cockpits, *Pilots, Flight clothing, Air Force equipment, Flight crews, Winter, Survival equipment, Simulation, Test methods, Test facilities, Anthropometry.
Identifiers: *Arm reach capabilities.

The lack of published arm-reach data on Air Force flight personnel in actual cockpit situations presents manifest difficulties to the cockpit layout specialist. This paper discusses the results of a study to determine the arm-reach capabilities of aircrewmen wearing heavy winter flight clothing, survival equipment, and restraint harnesses. The sample consisted of 16 male subjects (currently active Air Defense Command pilots). The subjects were (pilots) selected to approximate closely the various height-weight categories in the ADC flying population. A specially designed apparatus was constructed to measure arm-reach capability. Each subject was measured under four conditions. The results of the study indicate that there are significant differences in arm-reach capability of pilots while in the shirt-sleeved and maximum flying assembly conditions throughout most of the spatial envelope.

PB-242 221/0GA PC$7.50/MF$2.25
Michigan Univ., Ann Arbor. Highway Safety Research Inst.

Physical Characteristics of Children as Related to Death and Injury for Consumer Product Safety Design.
Final rept. Apr 72-31 Mar 75,
R. G. Snyder, N. L. Spencer, C. L. Owings, and L. W. Schneider. 31 May 75, 241p* UM-HSRI-BI-75-5
Contract FDA-72-70
Sponsored in part by Consumer Product Safety Commission, Washington, D.C.

Descriptors: *Children, *Anthropometry, *Product development, *Measuring instruments, Human body, Infants, Consumers, Computers, Potentiometers(Instruments), Center of gravity, Tables(Data), Data acquisition, Injuries, Human factors engineering.
Identifiers: *Product safety, Consumer products, Consumer protection.

A total of 41 body measurements were taken on 4027 infants and children representing the U.S. population from 2 weeks to 13 years old using specially modified anthropometers, calipers, and girth devices. These devices utilize a 10-turn potentiometer for electrical readout of length. A miniature pressure transducer in the paddle blades of the anthropometers and calipers provides for standardizing measurements on soft tissue. Measurement data were recorded automatically by a portable NOVA 1220 mini-computer system. Center of gravity in standing and sitting position was also obtained. Other devices were utilized for obtaining finger diameters, hand clearance, and grip size dimensions. Data are presented in both tabular and graphical format giving the mean, S.D., 5th, 50th, and 95th percentiles and number of measurements (N) for each age interval.

5G. Linguistics

AD-A011 120/3GA PC$4.25/MF$2.25
Bolt Beranek and Newman Inc Cambridge Mass
Speech Understanding Systems.
Quarterly progress rept. no. 2, 1 Feb-1 May 75,
William A. Woods, Richard M. Schwartz, Craig C. Cook, Dennis H. Klatt, and Jared J. Wolf. May 75, 63p Rept nos. BBN-3080, AI-30
Contract N00014-75-C-0533, ARPA Order-3080
See also Quarterly progress rept. no. 1, AD-A007 586.

Descriptors: *Phonetics, *Speech recognition, Acoustics, Data bases, Syntax, Phonology, Semantics, Information retrieval, Synthesis, Coding, Compilers, FORTRAN.

The report covers research and development work done from 1 February to 30 April 1975. Areas included in this work are acoustic-phonetics, lexical retrieval, lexical verification, and natural language syntax, semantics, prosodics, and pragmatics. The report consists of two parts -- a brief Survey of Progress containing a few paragraphs describing the major progress in the individual components of the project, and a Technical Notes section containing detailed specifications of experiments performed, programs implemented, design studies, and, where appropriate, supporting data and appendices. This second QTPR contains such technical notes on acoustic-phonetic research, speaker normalization, prosodics, semantic network retrieval, and a new language -- PCOMPILER -- designed for the phonetic and phonological modules of the lexical retrieval component.

AD-A011 178/1GA PC$3.25/MF$2.25
System Development Corp Santa Monica Calif
User's Guide to the SOLAR KWIC File.
Special technical rept.,
Timothy C. Diller, and Frank Heath. 30 May 75, 23p Rept no. TM-5292/008/00
Contract DAHC15-73-C-0080, ARPA Order-2254

Descriptors: *Semantics, *Words(Language), Speech recognition, English language, Information retrieval, Data processing, Indexes, Computational linguistics, Natural language, Manuals.
Identifiers: KWIC indexes, SOLAR(Semantically Oriented Lexical Archive), Semantically oriented lexical archive.

The document contains a general explanation of the KWIC file of SOLAR (a Semantically-Oriented Lexical Archive). It is intended as an introduction and reference manual for the on-line user, the casual reader, or the data collector.

5H. Man-Machine Relations

AD-A011 244/1GA PC$3.25/MF$2.25
Army Aeromedical Research Lab Fort Rucker Ala
Development of a Prototype Experimental Plan to Evaluate Stabilized Optical Viewing Devices: I. Inflight Measures of Visual Acuity.
Final rept.,
David D. Glick, Roger W. Wiley, Fred W. Guedry, Jr., and W. Carroll Hixson. Apr 75, 20p Rept no. USAARL-75-12 NAMRL-1213

Descriptors: *Motion sickness, *Target acquisition, Human factors engineering, Gyro stabilizers, Visual perception, Performance(Human), Display systems, Optics, Experimental data, Helicopters, Vertigo, Signs and symptoms, Pathology, Vestibular apparatus.
Identifiers: Evaluation, Recommendations, *Viewers.

An improved XM-76 stabilized viewing device was tested in a scout helicopter flight scenario. Target acquisition performance was significantly correlated with the airsickness ratings of an onboard experimenter. Since there was no significant difference between the magnitude of the symptoms observed when the device was stabilized and the magnitude when caged, the stabilization feature proper could not be identified as a problem source. Parts II and III of the report will deal with inflight measures of airsickness potential and the laboratory evaluation of individual susceptibility to airsickness respectively.

AD-A011 545/1GA PC$5.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Human Force Capabilities for Operating Aircraft Controls at 1, 3, and 5 gz.
Final rept.,
K. H. Eberhard Kroemer. Feb 75, 107p Rept no. AMRL-TR-73-54

Descriptors: *Man machine systems, *Flight control systems, *Biomechanics, Males, Aircraft, Aerospace medicine, Anthropometry, Acceleration tolerance, Tables(Data), Statistics, Flight crews, Strength(Physiology), Human factors engineering, Operators(Personnel).

The maximum isometric forces adult male subjects could exert at eight locations of hand-operated aircraft controls were measured at 1, +3 and +5gz. Forces were measured in two vertical and four to eight horizontal directions. Selected anthropometric dimensions were obtained on the subjects and compared with those from the 1967 USAF anthropometric survey of flying personnel. Summary statistics including the mean, standard deviation, coefficient of variation, symmetry, kurtosis, and selected percentiles, are presented for each of the 60 force exertion measures.

PB-242 506/4GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
The Human Factor in Automation,
P. J. A. Ketteringham. Apr 75, 12p BISRA-CEL/CF/3/75

Descriptors: *Human factors engineering, *Automation, Man machine systems, Industrial engineering, Process control, Great Britain.

In the past, design engineers have not been in a position to pay sufficient attention to the human factors implications of new manufacturing processes. This is due principally to the overriding pressures of technical and economic considerations. As the level of automation of the iron and steel industry's manufacturing processes increases, the role of the human operator becomes more, and not less, critical. If overall man-machine system performance is to reach expected levels then more consideration needs to be given to the operator's eventual role. Possible solutions to this increasingly important problem lie, in the short term, in adoption of an effective system design approach which can be enhanced, in the longer term, by research.

5I. Personnel Selection, Training, and Evaluation

AD-A011 117/9GA PC$4.75/MF$2.25
Naval Aviation Integrated Logistic Support Center Patuxent River Md
A Better Understanding of Enlisted Personnel Research.
Information rept.,
Harold B. Buckheister. 25 Apr 75, 87p Rept no. NAILSC-5-75

Descriptors: *Logistics support, *Enlisted personnel, *Naval aviation, *Personnel management, Naval personnel, Manpower utilization, Weapon systems, Life cycles, Naval research, Training, Organizations.
Identifiers: NAILSC(Naval Aviation Integrated Logistic Support Center), Naval aviation integrated logistic support center, PATAO(Personnel and Training Analysis Organization), Personnel and training analysis organization, NAVMMAC(Navy Manpower and Material Analysis Center), Navy manpower and material analysis center.

This study was conducted to identify the organizations and functions of the Navy activities that participate in establishing personnel/manning requirements during the life cycle of a weapons system. The activities reviewed included NAILSC, PATAO, and NAVMMACs, which respectively define the personnel/manning requirements for NAVAIR, NAVSEA and OPNAV. Each activity's position in the total manpower/personnel management function was identified and developed for use by NAILSC. An explanation of the NAILSC MO (Maintenance and Operating) factor, and life cycle involvement are presented for clarification.

AD-A011 118/7GA PC$5.25/MF$2.25
Naval Training Equipment Center Orlando Fla Training Analysis and Evaluation Group
A Method for Obtaining Post Formal Training Feedback: Development and Validation.
Final rept. Nov 73-May 75,
Frederick N. Dyer, Leonard E. Ryan, and Dorothy V. Mew. May 75, 114p Rept no. TAEG-19

Descriptors: *Naval training, *Management planning and control, Feedback, Assessment, Performance, Effectiveness, Modification, Questionnaires, Methodology, Statistical processes.
Identifiers: Recommendations.

This report presents a cost-effective method to be used by Navy schools to obtain feedback in-

formation from operational units regarding the adequacy of formal school training. Continuing application of this method will also identify the need for training modifications to meet changing operational requirements. The method was established as equivalent to personal interviews in an extensive experiment in which several feedback instruments and a number of procedures for their administration were compared. The experiment is described in this report and the results are presented and discussed. The quality of the data provided by this feedback method led to the recommendation that it be adopted for use throughout the Navy training system.

AD-A011 347/2GA PC$4.75/MF$2.25
Rosenstiel School of Marine and Atmospheric Science Miami Fla
Annual Report, 1973-1974 of the University of Miami, Dorothy H. and Lewis Rosenstiel School of Marine and Atmospheric Science.
1974, 77p

Descriptors: *Oceanography, *Education, Marine engineering, Marine biology, Marine geology, Marine goephysics, Atmospheric physics, Climate, Oceanographic data, Reviews, Universities, Scientific research.

Contents:
Graduate studies;
Division of Ocean engineering;
Division of biology and living resources;
Division of marine geology and geophysics;
Division of chemical oceanography;
Division of physical oceanography;
Division of atmospheric science;
Research cruises;
Publications.

AD-A011 377/9GA PC$9.50/MF$2.25
Singer-General Precision Inc Binghamton N Y Link Div
Study to Determine the Requirements for an Experimental Training Simulation System.
Final rept.,
Edward A. Stark, Victor Faconti, and Charles Mortimer. Feb 71, 340p NAVTRADEVCEN-69-C-0207-1
Contract N61339-69-C-0207

Descriptors: *Training devices, Simulators, Programmed instruction, Requirements, Human factors engineering, Weapon systems, Vehicle equipment, Computer aided instruction, Airborne, Shipboard, Simulation.

A study was performed to define an experimental system for the solution of human factors problems in training device design. Phase I identified training design problem areas through a review of tasks performed in military systems, and of the training implications of these tasks. Phase II identified equipment and software capable of supporting relevant experiments. Recommendations are made for an Experimental Training Simulation System for experimentation in (1) the design of trainee stations, (2) system fidelity requirements, (3) environmental simulation fidelity, (4) automated training, and (5) instructor station design. A five-year implementation plan is presented, for the procurement of modules to be employed independently, and in conjunction with each other as they are procured.

AD-A011 452/0GA PC$4.75/MF$2.25
Naval Training Equipment Center Orlando Fla Training Analysis and Evaluation Group
An Assessment of U.S. Navy Tactical Team Training Focus on the Trained Man.
Final rept.,
Eugene R. Hall, and William A. Rizzo. Mar 75, 86p Rept no. TAEG-18

Descriptors: *Training, *Teams(Personnel), *Tactical warfare, Decision making, Cooperation, Naval personnel, Performance(Human), Proficiency.

A study was conducted to compile resource information for planning regarding Navy tactical team training. Current practices in team training are discussed in light of the findings of the technical research literature. Recommendations for improving training operations are presented.

AD-A011 561/8GA PC$5.25/MF$2.25
Air Force Flight Test Center Edwards AFB Calif
Stability and Control. Volume I. Stability and Control Flight Test Techniques.
Final rept.
Jul 74, 117p Rept no. AFFTC-TIH-74-2-Vol-1
See also Volume 2, AD-A011 562.

Descriptors: *Air Force training, *Flight testing, *Handbooks, Aircraft, Stability, Stalling, Attitude control systems, Aerodynamic loading, Lift, Velocity, Maneuverability, Sideslip, Test methods.
Identifiers: Spin recovery, Trim angles, Engine out operations.

This handbook has been compiled by the instructors of the USAF Test Pilot School for use in the stability and control portion of the school's course. Most of the material in Volume 1 of this handbook has been extracted from several reference books and is oriented towards the test pilot.

AD-A011 562/6GA PC$10.50/MF$2.25
Air Force Flight Test Center Edwards AFB Calif
Stability and Control. Volume II. Stability and Control Flight Test Theory.
Final rept.
Jul 74, 420p Rept no. AFFTC-TIH-74-2-Vol-2
See also Volume 1, AD-A011 561.

Descriptors: *Air Force training, *Flight control systems, *Handbooks, Theory, Mathematical models, Equations of motion, Problem solving, Stability, Maneuverability, Dynamics, Stalling, Spinning(Motion), Roll, Aircraft.
Identifiers: Spin recovery.

The handbook has been compiled by the instructors of the USAF Test Pilot School for use in the Stability and Control portion of the school's course. The flight test techniques and data reduction methods in Volume 2 have been developed at the Air Force Flight Test Center, Edwards Air Force Base, California.

AD-A011 568/3GA PC$3.75/MF$2.25
Air Force Occupational Measurement Center Lackland AFB Tex
Personal Affairs Career Ladder AFSCs 73231, 73251, 73271, and 73294.
Occupational survey rept.
30 May 75, 48p Rept no. AFPT-90-732-159

Descriptors: *Personnel development, *Management, Job satisfaction, Careers, Job training, Air Force personnel, Surveys.
Identifiers: Career ladders, Personal services.

The report describes an occupational survey of the Personal Affairs career ladder, AFSC 732X1/73294, conducted by the Occupational Survey Branch, USAF Occupational Measurement Center, from 16 September 1974 through 26 November 1974. The report describes the development of the survey instrument, its administration to job incumbents, and resulting summaries of tasks performed by airmen grouped by skill level, experience level, and similarity of tasks performed. Results are also compared to current training and career field structure documents.

AD-A011 569/1GA PC$4.25/MF$2.25
Air Force Occupational Measurement Center Lackland AFB Tex
Nondestructive Inspection Specialist Career Ladder AFSCs 53630, 53650, 53670, and 53690.
Occupational survey rept.
30 May 75, 71p Rept no. AFPT-90-536-150

Descriptors: *Personnel development, *Nondestructive testing, Job satisfaction, Careers, Job training, Air Force personnel, Surveys.
Identifiers: Career ladders.

The report describes the results of the Occupational Survey of the Nondestructive Inspection career ladder, AFS 536XO, by the Occupational Survey Branch, USAF Occupational Measurement Center, from November 1973 to January 1975.

AD-A011 570/9GA PC$3.25/MF$2.25
Air Force Occupational Measurement Center Lackland AFB Tex
Sheet Metal Specialist/Technician Career Ladder AFSCs 53330, 53350, 53370, and 53690.
Occupational survey rept.
2 Jun 75, 25p Rept no. AFPT-90-533-147

Descriptors: *Personnel development, *Metalworking, Job satisfaction, Careers, Job training, Air Force personnel, Surveys.
Identifiers: Career ladders.

The report describes an occupational survey of the Sheet Metal Specialist/Technician career ladder, AFSC 533XO/53690, conducted by the Occupational Survey Branch, USAF Occupational Measurement Center, from 31 October 1974 through 5 February 1975. The report describes the development of the survey instrument, its administration to job incumbents, and resulting summaries of tasks performed by airmen grouped by skill level, experience level, and similarity of tasks performed.

AD-A011 571/7GA PC$3.75/MF$2.25
Air Force Occupational Measurement Center Lackland AFB Tex
Entomology Career Ladder AFSCs 56630, 56650, 56670, and 56690.
Occupational survey rept.
20 Jun 75, 45p Rept no. AFPT-90-566-152

Descriptors: *Personnel development, *Entomology, Pest control, Job satisfaction, Careers, Job training, Air Force personnel, Surveys.
Identifiers: Career ladders.

The Entomologist career ladder provides personnel with knowledges and skills necessary to implement, conduct, and evaluate programs and plans for the effective control and prevention of plant and animal pests. This report is intended to provide an in-depth study of this career ladder based upon a comprehensive review of work performed, equipment and pesticides which are most commonly used, and the effectiveness of the Air Force basic entomology course in providing the Air Force Entomologist with those knowledges and skills which are most widely used in the initial stage of his employment. Further, this report will summarize primary differences between the various skill levels and outline progression in terms of jobs performed after various periods in the career field.

AD-A011 616/0GA PC$3.75/MF$2.25
Arizona State Univ Tempe Dept of Educational Technology
Practice and Incentive Effects on Learner Performance: Aircraft Instrument Comprehension Task.
Final rept. Jun 73-Jul 74,

Barbara G. Tenpas, and Norman C. Higgins.
Dec 74, 28p AFHRL-TR-74-104
Contract F41609-71-C-0027

Descriptors: *Flight training, *Air Force personnel, Students, Motivation, Learning, Flight instruments, Test methods, Education, Programmed instruction.

AFROTC cadets learned an aircraft instrument comprehension task by reading self-instructional materials. No significant changes in posttest scores occurred when practice items were added to the materials or when simulator rides were offered as incentives. However, cadets who practiced the task and cadets who were offered the incentive performed faster on the posttest than those who only read the materials.

AD-A011 617/8GA PC$3.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Value of Personnel Classification Information.
Final rept. Jun 72-Mar 74,
James W. Abellera, Cecil J. Mullins, and James E. Earles. Mar 75, 34p Rept no. AFHRL-TR-75-2

Descriptors: *Personnel management, *Classification, Allocations, Information, Value, Budgets, Costs, Policies, Control, Mathematical models, Personnel selection, Job training, Optimization, Air force personnel.

The study outlines the development of a methodology for meaningfully estimating the value of classification information used by the Air Force to make selection/assignment decisions which lead to the satisfaction of first-term enlisted manpower requirements. The methodology, called the optimal allocation strategy, is employed to solve a representative allocation problem in a hypothetical enlistment year. This exercise serves to show how the value of available information may be estimated when used in the most efficient manner possible.

AD-A011 619/4GA PC$3.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Cost Estimates and Implications of Alternative Configurations of an Advanced Personnel Procurement System (APPS).
Technical rept.,
Michael D. Hawkins, Richard Crow, and Harry Haltman. Jun 74, 38p Rept no. AFHRL-TR-74-82

Descriptors: *Recruiting, *Data processing, Computers, Cost analysis, Personnel selection, Procurement, Enlisted personnel, Operations research, Job analysis, Aptitudes.

The study estimates operating, equipment installation and other start up costs of replacing the USAF Recruiting Service's semi-automated Accessions Control (ACC) by an on-line real time, computerized job reservation and person-job match system. The implications (including benefits) of such a system, referred to as an Advanced Personnel Procurement System (APPS) are also discussed. There are a number of ways that APPS can be configured and each configuration will have significant effects on how the Air Force conducts its recruiting efforts. For this reason, the costs and benefits of each configuration are compared so that decision makers can decide upon the best configuration.

AD-A011 620/2GA PC$6.25/MF$2.25
American Institutes for Research Washington D C
An Action Oriented Review of the On-the-Job Training Literature.
Interim rept. Jun 72-Jan 75,
Robert W. Stephenson, and James R. Burkett. Dec 74, 171p AFHRL-TR-74-66
Contract F41609-72-C-0036

Descriptors: *Job training, Assessment, Systems analysis, Cost effectiveness, Military training, Bibliographies, Literature surveys.
Identifiers: On job training.

The on-the-job training (OJT) literature was reviewed, and selected references were organized in terms of the following categories: literature reviews and bibliographies; handbooks and manuals; cost effectiveness; technique comparison studies; systems analysis of training; approaches to program evaluation; and military documents. In addition, a number of references were selected that are thought to contain innovative ideas that should be considered by people with responsibility for managing and evaluating OJT programs. The various ways in which these 'innovations' might address current interests or problems in the Air Force OJT program are described. Specific comments are made about the possible advantages associated with each idea. Estimates are also made of the resource requirements involved if modifications to existing procedures or programs were to be implemented.

COM-75-10668/2GA PC$3.75/MF$2.25
Texas A and M Univ., College Station. Sea Grant Coll. Program.
The University and the Sea. Volume 7, Number 6. November-December 1974. Special Issue: Texas A and M University Sea Grant College Report, 1973-74.
Bi-monthly pub.,
Laura Colunga. 1974, 29p NOAA-75042908

Descriptors: *Marine resources, *Ocean environments, *Education, Grants, Universities, Fisheries, Research projects, Shellfish, Seafood, Coastal zone management, Pollution, Shrimps, Texas, Mexico Gulf.
Identifiers: Sea Grant Program.

Historically concerned with the resources of the Gulf of Mexico, Texas A&M University was designated one of the nation's first Sea Grant Colleges. This special issue reports the accomplishments of A&M Sea Grant during the year ending August 31, 1974, in which support was provided for over 60 projects in six major program areas. About 49% of the 1973-74 expenditures was directed toward applied research; 29% toward advisory services; over 5% toward education and training; and 15% toward program management and development, including public and technical information services.

NTIS/PS-75/556/1GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Computer Aided Instruction. Volume 2. 1974-May 75 (A Bibliography with Abstracts).
Rept. for 1974-May 75,
Mary E. Young. Jul 75, 80p*
Supersedes COM-74-11376. See also Volume 1, NTIS/PS-75/557.

Descriptors: *Programmed instruction, *Bibliographies, *Teaching machines, Computer programming, Education, Cost effectiveness, Evaluation, Man machine systems, Systems analysis.
Identifiers: *Computer aided instruction.

Reports on the use of computers in education and the computer systems necessary are abstracted in the bibliography. Included are studies on motivation, technical training, learning factors, and human factors engineering. (Contains 75 abstracts). See also NTIS/PS-75/557, Computer Aided Instruction. Vol. 1. 1970-1974.

NTIS/PS-75/557/9GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Computer Aided Instruction. Volume 1. 1970-1974 (A Bibliography with Abstracts).
Rept. for 1970-1974,
Mary E. Young. Jul 75, 222p*
See also Volume 2, NTIS/PS-75/556.

Descriptors: *Programmed instruction, *Bibliographies, *Teaching machines, Computer programming, Education, Cost effectiveness, Evaluation, Man machine systems, Systems analysis.
Identifiers: *Computer aided instruction.

Reports on the use of computers in education and the computer systems necessary are abstracted in the bibliography. Included are studies on motivation, technical training, learning factors, and human factors engineering. (Contains 217 abstracts). See also NTIS/PS-75/556, Computer Aided Instruction. Vol. 2. 1974-May, 1975.

PB-241 911/7GA PC$3.75/MF$2.25
Mercy Coll. of Detroit, Mich. Social Science Research Center.
An Evaluation of Policy Related Research on Postsecondary Education for the Disadvantaged. Volume I. Executive Summary.
Final rept.,
Mary J. Mulka, and Edmund J. Sheerin. 1975, 39p* NSF/RA/S-75-006
Grant NSF-GI-39485
Paper copy also available in set of 2 reports as PB-241 910-SET, PC$16.00.

Descriptors: *Universities, *Technical schools, Disadvantaged minorities, Education, Specialized training, Evaluation, Students, Human resources, College enrollment, Policies.
Identifiers: *Disadvantaged groups.

The purpose of this study was to identify, review and assess the literature concerned with postsecondary education of disadvantaged youth, for internal validity, external validity and policy utility. The scholarship in this area fell into two categories: basic research and evaluative research. This study has aimed to evaluate the policy-related research literature concerned with postsecondary education of disadvantaged youth. The evaluation has been limited to that scholarship which is either currently or potentially available to decision makers.

PB-241 912/5GA PC$13.00/MF$2.25
Mercy Coll. of Detroit, Mich. Social Science Research Center.
An Evaluation of Policy Related Research on Postsecondary Education for the Disadvantaged. Volume II. Technical Report.
Final rept.,
Mary Janet Mulka, and Edmund J. Sheerin. 1975, 569p* NSF/RA/S-75-006A
Grant NSF-GI-39485
Paper copy also available in set of 2 reports as PB-241 910-SET, PC$16.00.

Descriptors: *Universities, *Technical schools, Disadvantaged minorities, Education, Specialized training, Evaluation, Students, Human resources, College enrollment, Policies.
Identifiers: *Disadvantaged groups.

The purpose of this study was to identify, review and assess the literature concerned with postsecondary education of disadvantaged youth, for internal validity, external validity and policy utility. The scholarship in this area fell into two categories: basic research and evaluative research. This report deals with the evaluation of policy related research which bears on equalizing the educational opportunities of advantaged and disadvantaged students on the postsecondary level, the major variables need to be defined: (1) disadvantaged, (2) equalizing educational opportunities, (3) postsecondary, and (4) policy research.

PB-242 081/8GA PC$4.25/MF$2.25
League of Kansas Municipalities, Topeka.
Equal Employment Opportunity and Affirmative Action. A Guideline for Local Governments.
Final rept.
Jan 75, 70p USCSC-74-KS-02C

Descriptors: *Equal employment opportunities, *Public employment, *Management methods, Manuals, Management quidelines, Personnel management, Federal assistance programs, Social effect, Project planning, Reporting methods, Public administration, Local government.
Identifiers: Legal aspects, Affirmative action, Complaints.

A manual is presented to explore the applications of affirmative action to public employment practices. The purpose of the manual is to assist public employers in complying with the legal and social aspects of the law. There are five parts: introduction, the legal basis for equal employment and affirmative action, basic steps to developing an affirmative action program for equal opportunity, affirmative action programs for federally-assisted projects, and complaints and reporting requirements.

PB-242 137/8GA PC$6.25/MF$2.25
Civil Service Commission, Atlanta, Ga. Intergovernmental Personnel Programs Div.
City of Douglas, Douglas, Georgia. Personnel Ordinance, Personnel Rules and Regulations, Pay Plan, and Classification Plan.
2 Jun 75, 175p USCSCP-R-3A1

Descriptors: *Government employees, *Local government, Civil service, Classifications, Employment, Salaries, Regulations, Ordinances, Public administration, Georgia.
Identifiers: Douglas(Georgia).

The report presents the basic materials needed to establish a merit system in a small jurisdiction with approximately 150 employees. The Personnel Ordinance provides the framework for establishing the personnel system. The Personnel Rules and Regulations provide the administrative procedures for carrying out the policies established by the Personnel Ordinance. The Classification and Pay Plans includes methods of Installation, allocation record, and class specifications.

PB-242 192/3GA PC$19.25/MF$2.25
Contract Research Corp., Belmont, Mass.
Public Sector Labor Relations: An Evaluation of Policy-Related Research. Executive Summary.
Final rept.,
Ralph T. Jones. Feb 75, 841p* NSF/RA/S-75-007
Grant NSF-C838
See also PB-242 231.

Descriptors: *Labor unions, *Government employees, Collective bargaining, Labor relations, Civil service, Supervisors, Government policies, National government, State government, Local government, Public employment, Bibliographies.

The report provides policy-makers with a summary and evaluation of current research in the field of public sector labor relations. In accord with the recommendations of potential users, it focuses upon the issues of unit determination, employer organization, scope of bargaining, union security, the merit system, impasse resolution and the impact of collective bargaining on wages, hours, and working conditions.

PB-242 231/9GA PC$3.75/MF$2.25
Contract Research Corp., Belmont, Mass.
Public Sector Labor Relations: An Evaluation of Policy-Related Research. Executive Summary.
Final rept.,
Ralph T. Jones. Feb 75, 30p NSF/RA/S-75-007A
Grant NSF-C838
See also PB-242 192.

Descriptors: *Labor unions, *Government employees, Collective bargaining, Labor relations, Civil service, Supervisors, Government policies, National government, State government, Local government, Public employment.

The purpose of the project is to produce an evaluation of research in the field of public sector labor relations that would be of use and interest to the greatest number of policy-makers: how to structure bargaining units, whether to limit the scope of bargaining, how to cope with impasses.

PB-242 372/1GA PC$3.75/MF$2.25
RAND Corp., Santa Monica, Calif.
An Evaluation of Policy Related Research on Programs for Mid-Life Career Redirection: Volume I. Executive Summary,
Anthony H. Pascal. Feb 75, 48p* R-1582/1-NSF
NSF/RA/S-75-002A
Grant NSF-C798
See also Volume 2, PB-242 373.

Descriptors: *Career development, *Employee transitions, Sector changes, Attitudinal changes, Economic changes, Social change, Employed women, Job satisfaction, Displacement, Reduction, Training programs, Surveys.
Identifiers: Reduction in force, Layoffs.

The report is a condensation of Volume 2, bearing the same title, containing an evaluation of the existing literature on mid-life redirection of careers. Materials discussed are age groups, statistics for sexes and races, geographic data, marital status, formal schooling, and occupational classifications, along with reasons for desiring change, displacements and layoffs, and retraining programs.

PB-242 373/9GA PC$7.00/MF$2.25
RAND Corp., Santa Monica, Calif.
An Evaluation of Policy Related Research on Programs for Mid-Life Career Redirection: Volume II. Major Findings,
Anthony H. Pascal, Duran Bell, Laurence A. Dougharty, William Dunn, and Velma Montoya Thompson. Feb 75, 192p* R-1582/2-NSF
NSF/RA/S-75-002B
Grant NSF-C798
See also Volume 1, PB-242 372.

Descriptors: *Career development, *Employee transitions, Surveys, Industrial relations, Sector changes, Attitudinal changes, Employed women, Job satisfaction, Displacement, Reduction, Criteria, Reference groups, Abilities, Training programs, Motivation, Manpower utilization, Forecasting, Federal programs, Retraining, Recommendations.
Identifiers: Reduction in force, Layoffs.

This report is an evaluation of the existing literature on mid-life redirection of careers It was written in response to an announcement which called for literature reviews on some 40 subjects in the broad fields of human resources problems and municipal systems. The report is a joint effort with extensive intergroup consultation occurring during the course of the study although individual authors are responsible for each of the chapters. A companion report, Volume I, Executive Summary, is a condensed and abbreviated version of the present volume.

PB-242 424/0GA PC$12.25/MF$2.25
Civil Service Commission, Washington, D.C. Office of Labor-Management Relations.
Union Recognition in the Federal Government: Statistical Summary. Summary Reports within Agencies, and Listings Within Agencies of Exclusive Recognitions and Agreements Under Executive Order 11491 as of November 1974.
Final rept.
Nov 74, 507p
Paper copy also available from GPO as SN-006-000-00847-0.

Descriptors: *Labor unions, *Government employees, National government, Union contracts, Federal civilian employees.
Identifiers: Federal agencies.

The report provides information on exclusive recognitions granted and agreements negotiated by Federal departments and agencies, including non-appropriated fund activites, under the provisions of Executive Order 11491--Labor-Management Relations in the Federal Government. Also included is data on recognitions and agreements for six other jurisdictions which do not fall under the Executive Order. The material, which is organized into three parts, contains graphs, summary tables and installation-by-installation listings of union recognitions and agreements. PART I provides summary data and statistical analysis of information extracted from reports submitted from Federal agencies and departments. PART II contains tables displaying recognition and agreement totals, by labor organization, within each of the reporting agencies. PART III consists of listings of recognitions and agreements within each agency.

PB-242 605/4GA PC$4.75/MF$2.25
Research Inst. of National Defence, Stockholm (Sweden).
GNOSIS: A System for Computer Aided Instruction. Second Edition,
Jacob Palme. May 75, 93p* FOA-P-C8373-M3(E5)
See also PB-224 529.

Descriptors: *Education, *Computer programming, *Programmed instruction, Sweden, Display devices, Adaptive systems, Learning, Teaching machines, Errors, Console typewriters, ALGOL.
Identifiers: *Computer aided instruction, GNOSIS instructional system, Command systems, Man computer communication.

GNOSIS is a system which makes it very simple for a teacher to produce a computerized lesson. The teacher compiles a lesson containing texts and questions and expected answers to the question. The teacher can check the student results and adjust the lesson after the students achievments by extra remedial sections for students with difficulties. The teacher can also react in special ways to different expected and unexpected false answers to questions by appropriate hints followed by a repetition of the wrongly answered question. Unexpected false answers are saved when a student takes a lesson, and later sent to the teacher to help him improve his lesson. GNOSIS is written in Algol for the DEC system 10 computer, but is probably not too difficult to transfer to another computer which has an Algol or preferably a Simula compiler.

PB-242 609/6GA PC$4.75/MF$2.25
Washington Univ., Seattle. Dept. of Management and Organization.
Venture Initiation Courses in U.S. Schools Interim Report to the National Science Foundation.
Final rept.,
Karl Vesper. Sep 74, 76p* NSF/RA/R-74-066
Grant NSF-DI-43539

Descriptors: *Business education, *Entrepreneurship, Schools, Students, Universities, Venture research, Surveys.

Identifiers: Curriculum development.

The report lists new business venture-related courses that are offered in U.S. schools of business and engineering. There are now 60 schools of business plus eight of engineering offering such courses to a total of 3,344 students per year--approximately two percent of the total faculty and student body. Most schools follow similar teaching patterns with projects, lectures, and case studies, but few schools are coming out with fully developed entrepreneurship programs. Few teachers appear to be specializing in research on entrepreneurship and there appears to be few--if any--methodological programs to monitor the impacts of entrepreneurship courses.

PB-242 744/1GA PC$4.75/MF$2.25
Rochester Univ., N.Y. Graduate School of Management.
Analysis of Juror Utilization in Monroe County,
Arif Sayeed, and James K. Farley. Oct 74, 85p
Grant LEAA-74-NI-02-0002

Descriptors: *Manpower utilization, *Courts, Cost benefit analysis, Computer aided evaluation, Operating costs, New York.
Identifiers: Juror utilization, Pilot cities program, Monroe County(New York).

The study examines schemes by which the size of the daily pool of potential jurors can be reduced without significantly increasing the probability of incurring delays due to the non-availability of jurors. Reduction in the size of the daily pool will mean that a fewer number of potential jurors will be utilized more intensively and will remain idle for shorter periods of time. The study examines six specific proposals which will enable the daily pool size to be reduced, and indicates for each proposal the amount of reduction and the saving in cost both to the court system as well as to the community.

PB-242 781/3GA PC$4.25/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank. Appendix I - Questionnaires.
Final rept.
Apr 75, 70p MEL-75-09-01
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 799-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Performance evaluation, *Data files, Interviews, Background, Opinions, Industrial training, Family relations, Social welfare, Data acquisition, National government, Questionnaires.
Identifiers: Public employment programs, Emergency Employment Act, Validation, Follow up programs.

This report provides examples of two questionnaires used in evaluating the Public Employment Program.

PB-242 782/1GA PC$3.75/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank. Appendix II. Sample Design and Methodology.
Final rept.
Apr 75, 49p MEL-75-09-02
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 799-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Performance evaluation, *Data files, Methodology, Survey methods and procedures, Statistical methods, Sample surveys, Social welfare, National government, Employment surveys.
Identifiers: Public employment programs, Emergency Employment Act, Validation.

This report describes the sample design and methodology used in the Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank.

PB-242 783/9GA PC$4.25/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank. Appendix III - Report on the Validation Study.
Final rept.
Apr 75, 73p MEL-75-09-03
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 799-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Performance evaluation, *Data files, Information systems, Systems analysis, Social welfare, National government, Personnel, Employment surveys.
Identifiers: Participants, Public employment program, Emergency Employment Act, Validation.

This report assesses the reliability and completeness of the Department of Labor's national file on individual participants in the Public Employment Program (PEP).

PB-242 784/7GA PC$3.75/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank. Appendix IV - Report on Participant Response.
Final rept.
Apr 75, 39p MEL-75-09-04
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 799-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Performance evaluation, *Data files, Methodology, Personnel, Interviews, Opinions, Survey methods and procedures, Statistical methods, Sample surveys, Responses, Data files, National government.
Identifiers: Participants, Emergency Employment Act, Public employment programs, Follow up programs, Validation.

This report describes the methods used to contact participants for interviews and the results of said efforts in terms of response for each wave of interviewing in the Longitudinal Evaluation of the Public Employment Program.

PB-242 785/4GA PC$3.75/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank. Appendix V - Comparative Analysis of Samples 1 and 2.
Final rept.
Apr 75, 50p MEL-75-09-05
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 799-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Personnel, *Data files, Employment surveys, Reference groups, Comparative studies, Job analysis, National government, Demographic surveys, Stopping, Statistical data, Attitudes.
Identifiers: Participants, Public employment programs, Emergency Employment Act, Validation.

This report compares the two separate samples drawn of participants in the Public Employment Program used in the Longitudinal Evaluation of the Public Employment Program.

PB-242 786/2GA PC$4.75/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank. Appendix VI - Technical Backup to Chapter 7.
Final rept.
Apr 75, 88p MEL-75-09-06
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 799-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Performance evaluation, *Data files, Mathematical models, Multivariate analysis, National government, Data processing, Comparative studies, Factor analysis, Labor force, Classifications, Employment surveys.
Identifiers: Participants, Nonparticipation, Validation.

This report contains a substantial elaboration of the summary findings reported in Chapter Seven of report I of the longitudinal evaluation and it discusses the results of efforts to use multivariate mathematical modelling techniques in treating the survey data.

PB-242 787/0GA PC$5.75/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank. Appendix VII. Part I. Tabs: QA-1.
Final rept.
Apr 75, 142p MEL-75-09-07
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 799-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Performance evaluation, *Data files, Social welfare, National government, Statistical data, Records, Earnings, Wage surveys, Supplementary benefits, Labor force, Services, Time.
Identifiers: Emergency Employment Act, Public employment programs, Validation.

This report provides the tabulations from the QA - 1 file which utilizes most of the data from the common record file of the Longitudinal Evaluation of the Public Employment Program.

PB-242 788/8GA PC$10.00/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank. Appendix VII. Part 2. Tabs: QA 5.1 and 5.2.
Final rept.
Apr 75, 351p MEL-75-09-08
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 799-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Performance evaluation, *Data files, Personnel, Statistical data, Time, Comparative studies, Education, Labor force, Records, National government, Ethnic group, Public assistance, Age groups, Males, Females, Social welfare.
Identifiers: Participants, Emergency Employment Act, Public employment programs, Validation, Disadvantaged groups.

This report provides tabulations on the QA 5.1 and QA 5.2 files which examines the effects of the Public Employment Program by comparing the labor force status of the participants at different pre- and post-program time periods.

PB-242 789/6GA PC$8.50/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank. Appendix VII - Part 3. Tabs: QA 6.1, 6.2 and SPECIAL.
Final rept.
Apr 75, 273p MEL-75-09-09
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 799-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Performance evaluation, *Data files, Statistical data, Labor force, Demographic surveys, Family relations, Social welfare, Age groups, Ethnic groups, Veterans programs, Employment surveys, Household characteristics, Social change, Family income.
Identifiers: Validation, Participants, Emergency Employment Act, Public employment programs, Disadvantaged groups, Marital status.

This report provides tabulations on (1) changes in household status (2) labor force status cross-tabulated with other variables and (3) other characteristics of the Public Employment Program participants, principally disadvantaged status and its relation to age, race and veteran status.

TT-72-55145/04 PC$3.75/MF$2.25
Office of Education, Washington, D.C.
Selected Bibliography of Educational Materials: Algeria, Libya, Morocco, and Tunisia. Volume 6, Number 4, 1972,
Azzedine Azzouz, Christiane Djemili, and Margaret Duggan Saidi. 1972, 48p
The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Education, *North Africa, *Bibliographies, Specialized training, Programmed instruction, Theories, Organizing, Algeria, Libya, Morocco, Tunisia, Translations, Vocational training.
Identifiers: Primary education, Secondary schools, Higher education.

Educational materials are documented for four North African nations, on a number of topics including theory, philosophy, adult and special education, organization, and bilingualism.

TT-74-55073/01 PC$3.75/MF$2.25
Office of Education, Washington, D.C.
Selected Bibliography of Educational Materials: Algeria, Libya, Morocco, and Tunisia. Volume 7, Number 1, 1973,
Azzedine Azzouz, Christiane Djemili, Margaret Duggan Saidi, and Janet Djebali. 1973, 46p
The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Education, *North Africa, *Bibliographies, Specialized training, Programmed instruction, Theories, Organizing, Algeria, Libya, Morocco, Tunisia, Vocational training, Translations.
Identifiers: Primary education, Secondary schools, Higher education.

Educational materials are documented for four North African nations, on a number of topics including theory, philosophy, adult and special education, organization, and bilingualism.

5J. Psychology (Individual and Group Behavior)

AD-A011 151/8GA PC$3.25/MF$2.25
California State Univ San Jose Dept of Speech-Communication
Proximity: Location, Time, and Opportunity to Communicate.
Technical rept.,
Peter R. Monge, and Kenneth K. Kirste. Mar 75, 24p Rept no. TR-3
Contract N00014-73-A-0476-0001

Descriptors: *Social communication, *Behavioral science, *Group dynamics, Range(Distance), Organization theory, Social psychology, Probability, Mathematical models, Computer applications, Interpersonal relations, Position(Location), Time.
Identifiers: Proximity, Social distance, Psychological distance, PROXVAL computer program.

Traditional measures of proximity all share three common weaknesses: (1) they are based upon ratio-level measurement of physical distance that may not correspond to 'psychological distance,' (2) they measure distance as a fixed rather than a variable quantity, and (3) they measure distance between pairs of individuals rather than larger groups of people. A conceptualization of proximity which attempts to deal with these problems for use in large organizations is developed. Proximity is defined as the probability of people being in the same location at the same point in time, creating an opportunity for face-to-face communication made possible by time and space. A computer program, PROXVAL, is described. Two studies, which report attempts at testing the procedure, are reported.

AD-A011 168/2GA PC$4.75/MF$2.25
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
A Framework for Representing Knowledge,
Marvin Minsky. Jun 74, 86p Rept no. AI-M-306
Contract N00014-70-A-0362-0003

Descriptors: *Reasoning, *Intellignece, *Performance(Human), Theory, Psychology, Linguistics, Artificial intelligence, Information processing, Natural language, Vision, Memory(Psychology).
Identifiers: *Thinking.

A partial theory is presented of thinking, combining a number of classical and modern concepts from psychology, linguistics, and AI. In a new situation one selects from memory a structure called a frame: a remembered framework to be adapted to fit reality by changing details as necessary, and a data-structure for representing a stereotyped situation. Attached to each frame are several kinds of information -- how to use the frame, what one can expect to happen next, and what to do if these expectations are not confirmed. The report discusses collections of related frames that are linked together into frame-systems.

AD-A011 285/4GA PC$3.25/MF$2.25
Maryland Univ College Park Dept of Psychology
Environmental Determinants of Alcohol Abuse.
Annual progress rept. no. 2, 1 Jul 74-30 Jun 75,
James E. Barrett. 15 Jun 75, 15p
Contract DADA17-73-C-3126
See also Annual progress rept. no. 1, AD-780 444.

Descriptors: *Alcoholism, Psychophysiology, Alcoholism, Ingestion(Physiology), Addiction, Monkeys, Drugs, Laboratory animals, Experimental data, Pharmacology.
Identifiers: *Psychoneuropharmacology, Alcohol ingestion.

The report examines environmental factors involved in the excessive ingestion of alcohol have been examined. Alcohol drinking is first induced in squirrel monkeys by the intermittent scheduling of food. Various manipulations are then performed which modify the environmental conditions under which behavior is observed in an effort to engender and identify events contributing to alcohol abuse. Changes in alcohol ingestion stemming from these procedures are then compared with changes when water is the available fluid. At the present time no selective effects on alcohol intake have been observed.

AD-A011 546/9GA PC$3.75/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
SEEKVAL Project IA1: Effects of Target Number and Clutter on Static Target Acquisition.
Final rept.,
Robert L. Hilgendorf, and John Milenski. Jul 74, 48p Rept no. AMRL-TR-74-14

Descriptors: *Target detection, *Visual acuity, Pilots, Helicopters, Tanks(Combat vehicles), Background, Clutter, Daylight, Performance(Human), Time studies, Statistical processes, Terrain models, Target acquisition, Central Europe.
Identifiers: SEEKVAL projects.

The report covers an experiment to determine the effects of number of targets and background clutter on static, low altitude, target detection performance by the unaided eye, as would be experienced in a helicopter-type target acquisition environment. The data consist mainly of whether or not single or groups of tank targets (1, 3, or 9) within controlled clutter configurations were detected, and the corresponding times to detect them. Statistical methods are employed to assess the effects of target and clutter factors on detection performance.

AD-A011 547/7GA PC$4.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
SEEKVAL Project IA1: Effects of Color and Brightness Contrast on Target Acquisition.
Final rept.,
Robert L. Hilgendorf, and John Milenski. Jul 74, 74p Rept no. AMRL-TR-74-55
See also AD-A011 546.

Descriptors: *Target acquisition, *Visual acuity, *Performance tests, Performance(Human), Colors, Contrast, Brightness, Clutter, Time, Tanks(Combat vehicles), Simulation, Statistical processes, Central Europe, Daylight, Terrain models, Test methods, Wavelengths.
Identifiers: SEEKVAL project.

The report covers an experiment to determine the effects of target color and brightness contrast on visual detection performance by means of the unaided human eye. The data consist mainly of elapsed times between search initiation and correct detection of tank targets at a simulated slant range of about 1 mile. Statistical methods are employed to assess the effects of color with three levels of contrast factor on detection performance. Under the experimental conditions, effects due to color and brightness contrast were each statistically rated, with the observation that interaction effects between these two factors were not statistically significant. The effect of color tended to account for more variance than the effect of brightness contrast.

AD-A011 549/3GA PC$3.75/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
The Effects of Extended Missions on the Performance of Airborne Command and Control Teams: A Field Survey.
Final rept.,
Robert D. O'Donnell, Ralph Bollinger, and Bryce O. Hartman. Jul 74, 31p Rept no. AMRL-TR-74-20

Descriptors: *Teams(Personnel), *Performance(Human), *Mission profiles, *Long range(Time), Human factors engineering, Airborne, Stress(Psychology), Decision making, Fatigue(Physiology), Attrition, Data acquisition, Information processing, Information transfer.
Identifiers: Cognitive tasks, Information interpretation, Communicating.

The report covers the effects of extended mission lengths on the performance of airborne command and control teams, wherein complex cognitive components consisting primarily of information collection, interpretation, and communication constitute the bulk of the workload. The survey centers on investigating general categories of performance-related factors, such as overall fatigue, rather than specific task performances such as long-term memory, sensory motor reaction time, or information processing.

AD-A011 567/5GA PC$3.75/MF$2.25
Martin Marietta Aerospace Orlando Fla
The Effect of Simulated Sun Angle on Air-to-Ground Target Acquisition.
Final rept.,
Melvin Freitag, Robert L. Hilgendorf, and Robert G. Searle. Mar 75, 30p Rept no. OR-13209 AMRL-TR-74-130
Contract F33615-74-C-4016

Descriptors: *Target acquisition, *Performance(Human), *Aerial reconnaissance, Air to surface, Airborne, Tanks(Combat vehicles), Sun, Angles, Visual acuity, Simulation, Terrain models, Range(Distance), Human factors engineering, Performance tests, Time.
Identifiers: Sun angle.

The purpose of this study was to determine the effect of sun angle on target acquisition by an airborne observer. The experiment was conducted according to a three-by-two repeated measures design, representing three simulated sun angles (0, 90, and 180 degrees with respect to the observer) and two terrain locations (hilly and flat). Three groups of ten subjects were asked to detect tank targets on a 1000:1 terrain table at both terrain areas. The test started at a maximum simulated slant range of 8500 feet and was reduced by 500 footsteps during each successive 30-second trial until a correct target detection occurred. The results of the tests are given and discussed.

AD-A011 574/1GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Practical Problems in Using Human Operator Performance Data,
Clyde R. Replogle, C. N. Day, F. M. Holden, and D. B. Rogers. Jul 73, 4p Rept no. AMRL-TR-72-84
Pub. in Proceedings of the Interagency Conference on Management and Technology in the Crew System Design Process, Los Angeles, on 12-14 September 1972.

Descriptors: *Performance(Human), *Stress(Psychology), *Combat effectiveness, Performance tests, Antiaircraft gunnery, Air to air, Weapon systems, Control systems, Tracking, Mathematical models, Hit probabilities, Systems analysis, Simulation.

During the past two years, human performance has been investigated within two generic system contexts--manually controlled antiaircraft artillery against high performance aircraft and air-to-air combat in air superiority fighters. The broad objective of this research was to assess the effectiveness of proposed air weapon systems, combat strategies, and countermeasures techniques. In meeting these objectives, it was necessary to address many problems associated with the use of human operator performance data. This paper describes six problem areas considered relevant for this workshop: system versus operator effectiveness, performance feedback, attrition modeling, stress tolerance, human operator identification, and system simulation.

AD-A011 607/9GA PC$6.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Evaluation of Two Link GAT-1 Trainer Tasks by Experienced Pilots at Three Alcohol Dose Levels.
Final rept. Mar 73-Jun 74,
Peter H. Henry, Thomas Q. Davis, Edward J. Engelken , Richard C. McNee, and Harold N. Keiser. Dec 74, 154p Rept no. SAM-TR-74-53

Descriptors: *Performance(Human), *Beverages, *Ethanols, Pilots, Training devices, Dosage, Attrition, Test facilities, Ratings, Questionnaires, Performance tests, Test construction(Psychology), Stress(Physiology).
Identifiers: Blood alcohol levels, GAT-1 trainers.

To calibrate the performance measuring scales for two separate tasks developed around the Link GAT-1 flight trainer, the degrading effects of ethyl alcohol were studied in 12 USAF instructor pilots. The subjects were tested at three alcohol dose levels (0.3, 0.6, and 0.9 gm alcohol/kg body wt.), which resulted in indirectly measured blood alcohol levels of approximately 30, 60 and 100 mg% respectively. Statistically significant performance decrements were found for only the moderate and high alcohol dose levels. The magnitudes of the decrements corresponded closely to those reported in previous experiments using the same test conditions but where the subjects had no previous flying experience.

COM-75-10767/2GA PC$4.75/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Applied Technology.
Windows and People: A Literature Survey. Psychological Reaction to Environments with and without Windows.
Building Science series rept. 30 Jan-1 Oct 74,
Belinda Lowenhaupt Collins. Jun 75, 97p* NBS-BSS-70
Library of Congress Catalog Card no. 75-619123. Paper copy also available from GPO as C13.29/2:70.

Descriptors: *Windows, *Psychological effects, *Human ecology, Reviews, Daylighting, Schools, Hospitals, Environments, Psychology, Safety, Architecture, Attitudes, Illuminance.
Identifiers: Photobiology.

An understanding of human requirements for windows in buildings can be developed through a survey of the literature on the reaction to environments with and without windows. Evaluation of the response to a variety of windowless situations reveals that although the attitudes toward a windowless space are often somewhat unfavorable, the most adverse reaction occurs in a small, restricted and essentially static environment. This suggests that one function performed by a window is the addition of a dynamic, active quality to an interior environment. Consideration of the response to the actual presence of windows indicates that another essential function of a window is the provision of a view of the external world. Although almost any view is acceptable, there is some evidence that views with a high information content are preferable. In addition, windows admit illumination, in the form of daylight and sunshine which furnish a dynamic, changing character to a room.

JPRS-64932 PC$3.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Phenomenology of Brutality,
K. A. Semenova. 6 Jun 75, 29p
Trans. of Priroda (USSR) n1 p89-101 1975.

Descriptors: *Behavioral sciences, *Abnormal psychology, Meetings, Animals, Children, Protection, USSR, Translations.
Identifiers: Brutality, Cruelty.

The report contains the results of the work of the first meeting on the problem of brutality from the standpoint of nature protection called by the Nature Protection Section of the Moscow Society of Naturalists.

JPRS-64979 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Analysis of Conditioned Reaction Reproduction,
R. Yu. Ilyuchenok. 11 Jun 75, 19p
Trans. of Zhurnal Vysshei Nervnoi Deyatelnosti (USSR) v24 n6 p1211-1221 1974.

Descriptors: *Amnesia, *Conditioned responses, *Memory, Etiology, Mental disorders, CNS disorders, Neurosis, Scopolamine, Puromycin, Drugs, Hypoxia, Etiology, USSR, Translations.
Identifiers: Neurochemistry, Cycloheximide.

The report contains data showing that memory disorders under the action of various amnesic agents are not real amnesia but are due to a disturbance of the reproduction of the conditioned reaction.

N75-23157/1GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Effects of Three Activities on Annoyance Responses to Recorded Flyovers.
W. J. Gunn, W. T. Shepherd, and J. L. Fletcher. Apr 75, 47p NASA-TM-X-72673

Descriptors: *Background noise, *Human tolerances, *Jet aircraft noise, *Noise intensity, Boeing 747 aircraft, Noise pollution, Noise tolerance.

For abstract, see STAR 1314

5K. Sociology

AD-A011 187/2GA PC$5.75/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Army Family Housing: Preferences and Attitudes About Housing Interiors. Volume III: Predictors of Satisfaction with Housing Interiors.
Final rept.,
D. L. Dressel, R. L. Brauer, R. D. Neathammer, C. B. Hahn, and R. S. Gorham. Apr 75, 145p
Rept no. CERL-TR-D-48-Vol-3
See also Volume 2, AD-A007 741.

Descriptors: *Housing(Dwellings), *Military personnel, *Attitudes(Psychology), Surveys, Floors, Windows, Washers(Cleaners), Kitchen equipment and supplies, Predictions.

This is the final volume of a three-volume study on Army family housing occupants' preferences and attitudes about housing interiors. This volume presents priority matrices and prediction models for occupant satisfaction with family housing features, based on occupants' ratings of their present quarters.

AD-A011 362/1GA PC$3.75/MF$2.25
West Virginia Univ Morgantown Dept of Sociology and Anthropology
Informant Accuracy in Social Network Data.
Interim rept.,
H. Russell Bernard, and Peter D. Killworth. 15 Jun 75, 48p Rept no. BK-110-75
Contract N00014-73-A-0417-0001

Prepared in cooperation with Cambridge Univ. (England).

Descriptors: *Sociometrics, *Data acquisition, Accuracy, Reliability, Networks, Comparison, Ratings, Behavior.
Identifiers: Self appraisals.

This paper examines the problem of informant accuracy in the production of social network data, through the use of a self-monitoring network. This allows a comparison between cognitive network data and informants' interactive behavior. Against expectations, it turns out that informants are extremely inaccurate, since informants' reports of their behavior can bear little resemblance to their behavior. An informant who claimed to have communicated with some person 'the most frequently' may have actually so communicated only 52% of the time. One implication of the findings is that theories of social structure built upon presently available network data are suspect.

AD-A011 615/2GA PC$3.25/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Variables Related to Hallucinogen Use.
Final rept. Jan 70-Sep 71,
Cecil J. Mullins, Joseph L. Weeks, and Bart M. Vitola. Dec 74, 24p Rept no. AFHRL-TR-74-95

Descriptors: *Enlisted personnel, *Hallucinogens, Drug abuse, Background, Aptitudes, Performance(Human), Promotion(Advancement), Air Force personnel, Surveys.

A sample of 1,283 self-admitted, pre-service hallucinogen users was compared with an equivalent sample of airmen who had no known record of drug abuse. The results of this study indicate that it is highly probable that hallucinogen users have used other drugs. There are relationships between hallucinogen use and geographic area of enlistment, aptitude scores, educational level, age at enlistment, and religious preference. Hallucinogen use is also related to the probability of receiving an undesirable discharge, to APR, and promotion rate.

NTIS/PS-75/548/8GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
The Elderly (A Bibliography with Abstracts).
Rept. for 1964-May 75,
Mary E. Young. Jul 75, 179p*
Supersedes COM-74-11393.

Descriptors: *Social welfare, *Bibliographies, *Old age, Retirement, Housing for the aged, Medical services, Age, Aging(Biology), Senior citizens, Transportation planning, Public buildings, Services, Older workers, Life styles, Geriatrics.
Identifiers: *Elderly persons.

Reports dealing with the elderly and their problems are abstracted in the bibliography. The topics covered include transportation, health care, social services, housing, and welfare. (Contains 174 abstracts).

PB-241 828/3GA PC$5.75/MF$2.25
Boston Univ., Mass. School of Law.
Prosecution in the Juvenile Courts: Guidelines for the Future,
M. Marvin Finkelstein, Ellyn Weiss, Stuart Cohen, and Stanley Z. Fisher. Dec 73, 129p*
Contract LEAA-NI-71-109

Descriptors: *Courts, *Juvenile delinquency, *Criminal justice, Criminology, Program design, Questionnaires, Systems analysis, Personnel management, Municipalities, Models, Objectives, Recommendations, Counties, Criteria, Management guidelines, Trends, Surveys, Massachusetts.
Identifiers: *Juvenile courts, Boston(Massachusetts), Court procedures, Prosecution, Prosecuting attorneys, Civil rights.

The authors have formulated some guidelines after a careful examination of the nature and character of the Boston Juvenile Court and the role of the prosecutor within it. The model program for Boston presents concrete objectives and priorities for juvenile prosecution, outlining specific responsibilities of prosecutors at various stages of the juvenile justice process. It recommends relationships between prosecution and other juvenile justice agencies, and suggests criteria for the juvenile prosecutor's office in areas such as personnel requirements, training, and support services. The author analyzes this model program's applicability to juvenile courts in other jurisdictions. The report includes a general description of the growth and development of the juvenile court system, highlighting the increased emphasis on procedure to safeguard juveniles' rights. The research methodology includes a survey of the legal literature, a questionnaire mailed to judges in 68 cities, interviews and direct observation of courtroom activity.

PB-241 872/1GA PC$4.75/MF$2.25
George Peabody Coll. for Teachers, Nashville, Tenn. Inst. on Youth and Social Development.
Juvenile Delinquency Prevention Programs. An Evaluation of Policy Related Research on the Effectiveness of Prevention Programs. Report on the Findings of an Evaluation of the Literature,
Michael Dixon, and William E. Wright. Oct 74, 94p* NSF/RA/S-74-034
Grant NSF-SSR73-07926-A01
Continuation of Grant NSF-GI-39345. See also PB-241 873.

Descriptors: *Juvenile delinquency, *Program design, Prevention, Reviews, Projects, Forecasting, Performance evaluation, Recommendations, Decision making, Information.

This report is published in two parts, Part one is the report; Part two is a supplement containing abstracts and rating s of empirical studies reviewed. It is addressed to decision makers in the field of juvenile delinquency prevention and to those individuals who have an active concern for juvenile delinquency prevention programs, such as ministers, volunteer workers, policemen, probation officers, members of city councils, mayors, or members of a professional group such as educators, welfare workers, or mental health care providers. The purpose is to give an overview of the state of the literature on juvenile delinquency prevention programs. In addition, the report specifies program areas which show promise for providing some degree of success and those areas which have clearly failed to make any progress toward the goal of prevention. The report also contains broad policy recommendations.

PB-241 873/9GA PC$5.25/MF$2.25
George Peabody Coll. for Teachers, Nashville, Tenn. Inst. on Youth and Social Development.
Juvenile Delinquency Prevention Programs: Supplement Containing Abstracts and Ratings of Empirical Studies,
Michael C. Dixon, and William E. Wright. Oct 74, 121p* NSF/RA/S-74-034A
Grant NSF-SSR73-07926-A01
Continuation of Grant NSF-GI-39345. See also PB-241 872.

Descriptors: *Juvenile delinquency, *Program review, Documentation, Research projects, Summarizing, Abstracts, Information, Evaluation.

This supplemental document in a two volume report is a year's work spent evaluating the literature on juvenile delinquency prevention programs. It collects and collates the best of the empirical research studies now available on this subject. The document first gives the search procedures used in the literature review, provides a series of tables summarizing the literature under nine major headings, and then gives an abstract of each study contained in the tables along with a brief rating of that study.

PB-242 154/3GA PC$4.75/MF$2.25
Mary Holmes Coll., West Point, Miss.
Mary Holmes College Research Project on Rural Blacks.
Final rept.,
Marcheta Z. Davis. 1974, 92p NSF/RA/X-74-009
Grant NSF-GI-38338

Descriptors: *Rural nonfarm population, *Negroes, *Demographic surveys, Research management, Research needs, Regional planning, Southern states, Meetings, Information systems, Problem solving, Alabama, Georgia, Family relations, Community structure, Arkansas, Mississippi, Economic profiles, Social change, Attitudes.
Identifiers: Democracy.

This is the report of a project to determine research priorities with respect to the black rural population. The work of the project was conducted in two phases. The first comprised a systematic survey of sources of current information on the rural black population. The second was a 1973 conference on black rural life, bringing together laymen and professionals interested in and knowledgeable about the current state of affairs. The conference was held at Mary Holmes College, and had as its theme 'Developing a Sense of Community: Problem Definition and Research Priorities.' Because it was felt that the problems of rural blacks may be unique from region to region, attention was limited to the Deep South states of Alabama, Georgia, Arkansas, and Mississippi, both in the survey and at the conference. The report includes the major addresses, discussion summaries, and research recommendations.

PB-242 270/7GA PC$5.75/MF$2.25
RAND Corp., Santa Monica, Calif.
Sample Design for the Housing Assistance Supply Experiment.
Final rept.,
Timothy M. Corcoran, Eugene C. Poggio, and Tiina Repnau. Nov 72, 138p WN-8029-HUD
Contract HUD-H-1789
Report on Housing Assistance Supply Experiment.

Descriptors: *Federal housing programs, *Financial assistance, *Low income families, Experimental design, Housing market, Community relations, Mobility, Statistical samples, Reliability, Regression analysis, Michigan.
Identifiers: Housing allowance programs, *Saginaw(Michigan).

This paper was prepared as part of the Supply Experiment, which is a major component of the Experimental Housing allowance Program. The Supply Experiment is designed to test the market and community response to a full-scale housing allowance program and to measure mobility patterns of recipient families. This working note proposes a sample design for field surveys. The Design provides a plan for determining the numbers and characteristics of residential structures, their owners, and their tenants; the plan is illustrated with data for the Saginaw, Michigan, SMSA, one of the candidate experimental sites.

PB-242 271/5GA PC$3.25/MF$2.25
RAND Corp., Santa Monica, Calif.

Sample-Selection Procedures for Site I.
Final rept.,
Eugene C. Poggio. Mar 73, 18p WN-8201-HUD
Contract HUD-H-1789
Report on Housing Assistance Supply Experiment.

Descriptors: *Federal housing programs, *Financial assistance, *Low income families, Experimental design, Housing market, Community relations, Mobility, Residential buildings, Structures, Wisconsin, Standard metropolitan statistical areas, National government.
Identifiers: *Green Bay(Wisconsin), Brown County(Wisconsin), Housing allowance programs.

This paper was prepared as part of the Supply Experiment, which is a major component of the Experimental Housing Allowance Program. The Supply Experiment is designed to test the market and community response to a full-scale housing allowance program and to measure mobility patterns of recipient families. The document describes the first stage in a multistage procedure for selecting a sample of residential parcels in Brown County, Wisconsin, and a sample of nonresidential parcels in the urbanized portions of Brown County. The final samples will then be monitored to provide data for the Supply Experiment.

PB-242 272/3GA PC$5.25/MF$2.25
RAND Corp., Santa Monica, Calif.
The Role of Household Survey Data in the Supply Experiment.
Final rept.,
Adele Massell. Mar 73, 109p WN-8218-HUD
Contract HUD-H-1789
Report on Housing Supply Experiment.

Descriptors: *Federal housing programs, *Financial assistance, *Low income families, Experimental design, Housing market, Community relations, Mobility, Wisconsin, Household characteristics, Demographic surveys, Interviews, Landlord tenant relations, Regression analysis.
Identifiers: Housing allowance programs, *Green Bay(Wisconsin).

This paper was prepared as part of the Supply Experiment, which is a major component of the Experimental Housing Allowance Program. The Supply Experiment is designed to test the market and community response to a full-scale housing allowance program and to measure mobility patterns of recipient families. The documents provides an analysis of the size and composition of household survey samples required to address each of the major research questions within the charter of the Supply Experiment.

PB-242 273/1GA PC$7.00/MF$2.25
RAND Corp., Santa Monica, Calif.
Proceedings of the General Design Review of the Housing Assistance Supply Experiment Held at Washington, D.C. on 25-27 June 1973.
Final rept.
Oct 73, 177p WN-8396-HUD
Contract HUD-H-1789
Report on Housing Assistance Supply Experiment.

Descriptors: *Federal housing programs, *Financial assistance, *Low income families, Experimental design, Housing market, Community relations, Mobility, Sites, Meetings, Evaluation, Pattern recognition, Surveys, Opinions.
Identifiers: Housing allowance programs.

This is a summary of the proceedings of a three-day meeting convened by the Rand Corporation to review the design of the Housing Assistance Supply Experiment. The Note includes both a summary of the discussion during the three-day review and supplementary memoranda provided by some of the twelve panelists chosen jointly by Rand and HUD to review the Experiment's Design.

PB-242 355/6GA PC$6.25/MF$2.25
Fairfax County Office of Research and Statistics, Va.
Demographic Factors of Growth in Fairfax County, 1960-1970.
Research paper,
Jeanne E. Griffith. Jul 74, 174p FXCO/ORS-75/4, PLUS-RP-5

Descriptors: *Population dynamics, *County planning, *Demographic surveys, Virginia, Fertility rates, Mortality statistics, Population migrations, Housing studies, Trends, Data files, Regional planning, Management methods, District of Columbia, Metropolitan areas, Growth rate, Forecasting.
Identifiers: *Fairfax County(Virginia).

The analysis details the demographic factors of growth contributing to Fairfax County's current population and its composition. The document serves four basic purposes. First it discusses demographic trends (fertility, mortality, migration, and housing trends) for the period 1960-1970. Second, the County trends are compared to those of the surrounding jurisdictions in the Washington Metropolitan area, and to small areas within the county. The third purpose is to establish a data base and analytical methodology supportive of the planning process. Finally, a basis or benchmark is developed for future analysis of Fairfax County's population.

PB-242 360/6GA PC$4.25/MF$2.25
Fairfax County Dept. of Consumer Affairs, Va.
Something to Dwell on: Home Buyer's Shopping Guide.
Consumer guide.
Jul 74, 60p FXCO/CPC-75/14

Descriptors: *Houses, *Purchasing, Instructions, Family income, Ownership, Design, Construction, New construction, Financing, Consumer protection, Local government, Virginia.
Identifiers: Fairfax County(Virginia).

The document is a guide to help consumers in selecting a home for purchase. Contents include discussion of family needs and factors to consider when looking for a house; advantages of new and older houses; sales procedures and pitfalls; kinds of financing; closing procedures; and what to do when problems arise.

PB-242 560/1GA PC$4.25/MF$2.25
American Justice Inst., Sacramento, Calif.
Ex-Convict Motivation and Recovery Center (X-MARC)-Second Year Evaluation Report, July 1, 1972-June 30, 1973,
Joyce Berkowitz, and Dale K. Sechrest. Aug 74, 61p
Prepared in cooperation with California Office of Criminal Justice Planning, Sacramento. See also PB-225 112.

Descriptors: *Rehabilitation, *Crimes, Probation, Adjustment(Psychology), Correctional services planning, Effectiveness, Cost benefit analysis, Project management, Surveys, California.
Identifiers: *Parolees, Recidivism.

The X-Marc Project was designed to help parolees, ex-felons, and probationers adjust to community living in Santa Clara County, California. The project attempted to reduce recidivism, and to provide an alternative to incarceration by establishing an improved living arrangement. House four-week residents did as well as all other parolees to Santa Clara County through the sixth month after their release, doing more poorly thereafter. The evaluators recommended a longer period of time at X-Marc to reduce recidivism levels. They also saw a need for a stronger job placement or vocational training program to assist these individuals in becoming stable community members. Interviews with resident indicated the need for an employment counselor. The evaluators concluded that the program be continued and expanded. The document includes statistical data and tables.

PB-242 561/9GA PC$4.25/MF$2.25
American Justice Inst., Sacramento, Calif.
Ex-Convict Motivation and Recovery Center (X-MARC)-Final Evaluation Report.
Final rept.,
Joyce Berkowitz. Aug 74, 66p
See also PB-242 560. Prepared in cooperation with California Office of Criminal Justice Planning, Sacramento.

Descriptors: *Rehabilitation, *Crimes, Probation, Adjustment(Psychology), Correctional services planning, Effectiveness, Cost benefit analysis, Project management, Surveys, California.
Identifiers: *Parolees, Recidivism.

The X-Marc halfway house has demonstrated an ability to delay the occurrence of recidivism, even though its clients were considered to be the least likely to succeed in community life according to classification tests. The ex-convict motivation and recovery center is a residential facility that is designed to help parolees, ex-felons and probationers to adjust to community living and to reduce their rates of recidivism by providing a meaningful alternative to incarceration for those men and women who need a level of custody between incarceration and normal probation and parole, by establishing a living arrangement and environment conducive to the success of these men and women, and by establishing a better relationship between its clients, their probation officers and the community. Demographic data was taken from project files and X-MARC clients were administered a questionnaire. The results are presented and analyzed in terms of resident recidivism, individual employment services provided for residents, resident assessments, and a cost-benefit analysis.

PB-242 594/0GA PC$3.75/MF$2.25
Rochester Univ., N.Y. Graduate School of Management.
Research and Management Utilization of a Court Information System,
Lois Horwitz, Lee Mairs, M. R. Rao, and Richard Thaler. Mar 75, 50p
Grants LEAA-73-DF-02-0013, LEAA-74-NI-02-0002
Prepared in cooperation with Rochester-Monroe County Criminal Justice Pilot City Program, N.Y.

Descriptors: *Criminal courts, *Regional planning, *Management information systems, Computerized simulation, Models, Resources, Delay time, Specifications, Economic characteristics, Evaluation, Management guidelines, Cost effectiveness, Methodology, Urban planning, County planning, New York.
Identifiers: *Rochester(New York), Monroe County(New York).

The report discusses the applicability of simulation and related models for the study of the use of court resources and delay. Previous efforts to apply modeling techniques to the criminal justice system are reviewed, and three computerized court system models developed for other localities are analyzed, with detailed information on their scope, limitations, and costs. One of the recommendations made is to develop a comprehensive computer simulation model for the local court system, and the data items necessary as input to such a model are specified. The specifications for a post-imple-

mentation evaluation design are given. An economic model for the evaluation of computer systems is developed, which consists of guidelines for both a cost-benefit and cost-effectiveness analysis. Factors to be considered in the analysis are specified, along with techniques to be employed and a work plan for effecting the evaluation.

PB-242 719/3GA PC$7.00/MF$2.25
Virginia Div. of Justice and Crime Prevention, Richmond.
We Hold These Truths-National Conference on Corrections, Held at Williamsburg, Virginia on December 5-8, 1971.
Dec 71, 197p
Prepared in cooperation with Law Enforcement Assistance Administration, Washington, D.C.

Descriptors: *Correctional institutions, *Improvement, *Meetings, Rehabilitation, Standards, Objectives, Criminal justice, Community relations, Minorities, Recreation, Education, Personnel development, Correctional services planning, Workshops.
Identifiers: Recidivism.

In December, 1971, approximately 300 corectional Administrators, Criminal Justice Practitioners, and representatives of a cross-section of the national community of public and private organizations whose support could be enlisted for a national drive to reform corrections met in Williamsburg, Virginia. These delegates to the National Conference on Corrections met in workshop sessions to discuss the present condition and future directions of corrections. This report presents the major addresses delivered to the delegates and the workshop discussion papers and group reports which emerged from their work. The major addresses include remarks by Chief Justice Warren Burger, a commentary based on personal experience by an ex-offender, and several speeches on the themes of 'the plight of corrections', 'correctional problems and programs in other nations', and 'the emerging rights of offenders'.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A011 262/3GA PC$3.25/MF$2.25
Edgewood Arsenal Aberdeen Proving Ground Md
The Influence of Age, Sex, and Oral Contraceptives on Human Blood Cholinesterase Activity.
Technical rept. Mar-Jun 74,
Frederick R. Sidell, and Andris Kaminskis. Jun 75, 14p Rept no. EB-TR-75019

Descriptors: *Cholinesterase, Aging(Physiology), Hormones, Physiological effects, Enzymes, Sex, Blood, Blood plasma, Erythrocytes, Females, Males, Chemical agents, Tables(Data).
Identifiers: Oral contraceptives.

The red blood cell and plasma cholinesterase activities of 443 men and 258 women were estimated and the results were tabulated by age, sex, and for the women, by whether or not they were taking oral contraceptives. The findings were: premenopausal women have less plasma cholinesterase activity than men of the same age but higher plasma cholinesterase activity than women taking oral contraceptives, red blood cell cholinesterase activity increases with the age of the individual until the sixth decade, and women taking oral contraceptives have more red blood cell activity than other women of the same age.

AD-A011 296/1GA PC$3.25/MF$2.25
Army Medical Research Inst of Infectious Diseases Frederick Md
A Microprecipitation Test for Rapid Detection and Identification of Venezuelan, Eastern and Western Equine Encephalomyelitis Viruses,
Neil H. Levitt, Helen V. Miller, Carl E. Pedersen, Jr., and Gerald A. Eddy. 4 May 74, 4p
Availability: Pub. in The American Jnl. of Tropical Medicine and Hygiene, v24 n1 p127-130 Jan 75.

Descriptors: *Group A arboviruses, *Venezuelan equine encephalomyelitis virus, *Chemical precipitation, *Eastern equine encephalomyelitis virus, *Western equine encephalomyelitis virus, Diagnosis(Medicine), Gamma globulin, Cellulose acetates, Electrophoresis, Detection, Reprints.

The development of a new diagnostic procedure for the identification of Venezuelan, eastern and western equine encephalomyelitis (VEE, EEE, WEE) viruses is described. The procedure utilizes virus precipitation with reference fluorescein-conjugated gamma globulin, followed by cellulose acetate electrophoresis. Clinical specimens containing varying concentrations of virus yielded, in primary duck embryo cell culture, sufficient virus for detection within 22 to 44 hours. Identification of VEE, EEE and WEE virus in specimens was accomplished by microprecipitation within this time. In contrast to conventional identification methods, our procedure eliminates the costs of utilizing laboratory animals and considerably reduces the time required for virus identification. (Author)

AD-A011 297/9GA PC$3.25/MF$2.25
Army Medical Research Inst of Infectious Diseases Frederick Md
Paramagnetic Spin Label Interactions with the Envelope of a Group A Arbovirus Lipid Organization,
Floyd Hughes, and Carl E. Pedersen, Jr. 15 Oct 74, 9p
Availability: Pub. in Biochimica et Biophysica Acta, 394 p102-110 1975.

Descriptors: *Group a arboviruses, *Venezuelan equine encephalomyelitis virus, *Electron paramagnetic resonance, Lipids, Nitroxides, Reprints.
Identifiers: Spin labeled molecules.

Electron paramagnetic resonance observations were made on nitroxide spinlabeled molecules which were bound to the TC-83 vaccine strain of Venezuelan equine encephalomyelitis virus. paramagnetic resonance parameters derived from the observations and their dependence on sample temperature were similar but not identical to those which have been reported for these labels dissolved in lipid bilayer membranes of mammalian and bacterial origin. The data are consistent with the existence of a bilayer lipid structure in the virion envelope which has a mechanical rigidity substantially greater than that of bilayers in cellular membranes. A model is presented which assumes the location of the lipid bilayer outside the nucleoprotein capsid and inside a spherical layer of envelope proteins. The model is in accord with Harrison's X-ray diffraction results for Sindbis virus. The model is discussed in terms of its implications with respect to the role played by lipid in viral maturation and infectivity. (Author)

AD-A011 299/5GA PC$3.25/MF$2.25
Army Medical Research Inst of Infectious Diseases Frederick Md
A Rapid Method for Determining ATP by the Firefly Luciferin-Luciferase System,
N. A. Neufeld, R. D. Towner, and Judith Page. 8 Aug 74, 2p
Availability: Pub. in Separatum Experientia, v31 n3 p391-392 1975.

Descriptors: *Adenosine phosphates, Detection, Determination, Enzymes, Luminescence, Photometers, Reprints.
Identifiers: Adenosine triphosphat, Luciferin, Fireflies, *Luciferase.

AD-A011 508/9GA PC$3.25/MF$2.25
Harvard Medical School Boston Mass Dept of Physiology
Regulation of Protein and Amino Acid Degradation in Skeletal Muscle,
Alfred L. Goldberg, and Richard Odessey. 1974, 14p Rept no. ISBN-90 2190226 5
Grant AF-AFOSR-1807-69
Pub. in Proceedings of an International Conference, Carefree, Ariz., 15-19 Oct 73. Excerpta Medica International Congress Ser333 p187-199 1974. (Exploratory Concepts in Muscular Dystrophy II).

Descriptors: *Musculoskeletal diseases, *Muscles, *Protein metabolism, Catabolism, Amino acids, Biochemistry, Biosynthesis, Growth(Physiology), Physiology.
Identifiers: Muscular dystrophy.

The article reviews recent investigations on the following aspects of protein metabolism in muscle: (1) In muscle the average rates of protein catabolism vary under different physiological conditions, e.g. fasting. Several factors have been found to reduce protein catabolism, including insulin, glucose, and branched chain amino acids. In addition, repeated contractions and passive tension on the muscle retard net proteolysis. (2) Muscle rapidly oxidizes 3 required amino acids - leucine, isoleucine, and valine. This process increases severalfold upon fasting, in diabetes, and after hypophysectomy. (3) Muscle releases into the circulation large amounts of alanine. This process is linked to degradation of the branched chain amino acids. Since alanine is a major precursor for glucose synthesis in liver and since liver releases branched chain amino acids selectively during gluconeogenesis, there appears to be a cycle between muscle and liver of branched chain amino acids and alanine.

AD-A011 511/3GA PC$3.25/MF$2.25
Harvard Medical School Boston Mass Dept of Physiology
Origin and Possible Significance of Alanine Production by Skeletal Muscle,
Richard Odessey, Edward A. Khairallah, and Alfred L. Goldberg. 17 Apr 74, 9p
Grant AF-AFOSR-1807-69
Availability: Pub. in Jnl. of Biological Chemistry, v249 n23 p7623-7629, 10 Dec 74.

Descriptors: *Alanines, *Muscles, *Biochemistry, Skeleton, Amino acids, Proteins, Sources, Rats, Diaphragms(Anatomy), Reprints.
Identifiers: Skeletal muscles.

These experiments were undertaken to determine the source of alanine released by skeletal muscle and to clarify the possible relationships between this process and the degradation of branched chain amino acids, the release of glutamine, and protein turnover in this tissue. During incubation in vitro, the rat diaphragm underwent net protein breakdown and released amino acids into the medium at a linear rate. The diaphragm released larger amounts of alanine and glutamine and lower amounts of leucine, isoleucine, and valine than would be expected from the average composition of muscle protein. Addition of the branched chain amino acids increased the production of alanine, glutamate, lysine, but not glutamine by the diaphragm in a concentration-dependent manner. At the same time, the branched chain amino acids inhibited net protein breakdown; therefore the increased amounts of alanine, glutamate, and lysine must have resulted from denovo synthesis or reduced catabolism of

these amino acids. All the other amino acids together failed to increase the production of alanine or glutamate. Alanine production in muscle appears related to the rapid oxidation of the branched chain amino acids.

AD-A011 512/1GA PC$3.25/MF$2.25
Harvard Medical School Boston Mass Dept of Physiology
Degradation of Abnormal Proteins in 'Escherichia Coli'. Formation of Protein Inclusions in Cells Exposed to Amino Acid Analogs,
Walter F. Prouty, Morris J. Karnovsky, and Alfred L. Goldberg. 15 Apr 74, 12p
Grant AF-AFOSR-1807-69
Availability: Pub. in Jnl. of Biological Chemistry, v250 n3 p1112-1122, 10 Feb 75.

Descriptors: *Proteins, *Escherichia coli, Amino acids, Abnormalities, Analogs, Degradation, Reprints.

Cells of Escherichia coli selectively degrade proteins that have incorporated amino acid analogs. Within 1 hour after exposure of cells of canavanine, 50% of the analog-containing proteins were degraded to acid-soluble form. At the same time, no net loss of canavanine-containing protein occurred from the 100,000 x g supernatant. Instead, most of the proteins containing the analog, unlike normal ones, accumulated in particulate fractions sedimenting at 10,000 x g or 100,000 x g. They were then lost from these fractions concomitant with the degradation of the abnormal proteins. The loss of such proteins from particulate fractions accounted for all of the protein degraded to acid-soluble form. Similar observations were obtained after incorporation of other analogs or puromycin. Findings suggest that (a) the presence of amino acid analogs in proteins can make them less soluble, and (b) the inclusions are formed by the spontaneous precipitation of abnormal proteins rather than by an active granule-forming process.

AD-A011 513/9GA PC$3.25/MF$2.25
Harvard Medical School Boston Mass Dept of Physiology
Effects of Insulin, Glucose, and Amino Acids on Protein Turnover in Rat Diaphragm,
Richard M. Fulks, Jeanne B. Li, and Alfred L. Goldberg. 27 Jun 74, 10p
Grant AF-AFOSR-1807-69
Availability: Pub. in Jnl. of Biological Chemistry, v250 n1 p290-298, 10 Jan 75.

Descriptors: *Proteins, *Biochemistry, *Rats, *Diaphragms(Anatomy), Insulin, Glucose, Amino acids, Synthesis(Chemistry), Degradation, Reprints.

A simple method is described for measuring rates of protein synthesis and degradation in isolated rat diaphragm. Muscles incubated in Krebs-Ringer bicarbonate buffer showed a linear rate of synthesis for 3 hours. At the same time, the muscle released tyrosine and ninhydrin-positive material, primarily amino acids, at a linear rate. This release was not a non-specific leakage of material from the intracellular pools, but reflected net protein degradation. Tyrosine was chosen for studies of protein turnover, since it rapidly equilibrates between intracellular pools and the medium, it can be measured fluorometrically, and it is neither synthesized nor degraded by this tissue. To follow protein degradation independently of synthesis, muscles were incubated in the presence of cycloheximide. Under these conditions, the amount of tyrosine in the intracellular pools was constant, while the muscle released tyrosine at a linear rate. This tyrosine release was used as a measure of degradation. The addition of amino acids at plasma concentrations both promoted protein synthesis and inhibited degradation in the diaphragm.

AD-A011 556/8GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Adaptation of the King Armstrong Method for Alkaline Phosphatase to the Auto Analyzer II System.
Final rept.,
Rodney C. Andrews. Apr 75, 13p Rept no. AMRL-TR-74-120

Descriptors: *Phosphatases, *Enzymes, *Laboratory animals, *Blood chemistry, Blood analysis, Monkeys, Blood serum, Test methods, Test equipment, Analyzers.
Identifiers: *Auto analyzers, *Alkaline phosphatases, King Armstrong technique.

The study covers the use of the Auto Analyzer II system and modified King Armstrong techniques to reduce both the operation time and volume of reagents required in determining alkaline phosphate activity in laboratory animals.

COM-75-10708/6GA PC$3.25
California Univ., Davis. Dept. of Food Science and Technology.
Loss of Free-Radical Signal During Induction Period of Unsaturated Lipids Containing Nitroxide Antioxidants,
James S. Lin, Vega Smith, and Harold S. Olcott. 11 Feb 74, 5p NOAA-75050503
Grant NOAA-2-35208
Sponsored in part by Tuna Research Foundation, Terminal Island, Calif. Pub. in Jnl. of Agricultural and Food Chemistry, v22 n4 p682-684 Jul/Aug 74.

Descriptors: *Lipids, *Free radicals, *Antioxidants, Electron paramagnetic resonance.
Identifiers: Reprints, *Nitroxides.

Stable free-radical nitroxides have marked antioxidant activity in unsaturated lipids. The amount of residual nitroxide can be estimated from the electron paramagnetic resonance (epr) signal. With three different nitroxides in squalene at 37C the signal gradually decreased during the induction period. Only when it was no longer or barely detectable, did active uptake of oxygen begin. At 50C with squalene and with menhaden oil, active oxidation began while the nitroxide signal was still measurable. In squalene at 37C, the three nitroxides studied, Tempol, Synvar 611, and Synvar 614, had relative antioxidant activities at equivalent molarities of approximately 2:1.2:1. A simplified method for following weight gain and epr signal without transfer of sample is described.

COM-75-50192-02-08/GA
(Order as COM-75-50192-02)
National Marine Fisheries Service, Seattle, Wash. Northwest Fisheries Center.
Spin-Labeling Techniques for Studying Mode of Action of Petroleum Hydrocarbons on Marine Organisms,
William T. Roubal, and Tracy K. Collier. Jul 74, 8p NOAA-75051501-8
Prepared in cooperation with Washington Univ., Seattle. Coll. of Fisheries.
Included in Fishery Bull., v73 n2 p299-305 Apr 75.

Descriptors: *Aquatic animals, *Hydrocarbons, *Electron paramagnetic resonance, *Membranes(Biology), Free radicals, Biochemistry, Marine biology, Electrons, Spectra, Contaminants.
Identifiers: *Molecular biology, *Spin labeling.

Spin-labeling studies of membrane-contaminant interaction are being conducted by biochemists at the Northwest Fisheries Center in Seattle, Washington. The aim of these studies is to gain a better understanding of the mode of action of hydrocarbon contaminants at the molecular level. Basic spin-labeling theory together with experimental results are presented and discussed. Spin-labeling holds great promise not only for environmental studies but also for drug research, toxicology, and pharamacology as well.

N75-22379/2GA PC$3.25/MF$2.25
Unilever Research, Vlaardingen (Netherlands).
The Determination of Prostaglandin Metabolites in Human Urine.
D. H. Nugteren. 1975, 23p
Misc-Revised. Subm-Submitted for Publication.

Descriptors: *Endocrine secretions, *Hormone metabolisms, *Prostate gland, *Urine, Biosynthesis, Carboxylic acids, Chemical analysis, Creatinine, Organic compounds, Urinalysis.

For abstract, see STAR 1314

N75-22380/0GA PC$3.25/MF$2.25
Unilever Research, Vlaardingen (Netherlands).
Arachidonate Lipoxygenase in Blood Platelats.
D. H. Nugteren. 1975, 18p
Subm-Submitted for Publication.

Descriptors: *Blood, *Lipids, *Oxidase, *Platelets, Chemical analysis, Enzyme activity, Fatty acids, Hydroxyl compounds.

For abstract, see STAR 1314

N75-23143/1GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Validity of Determination of Diurnal Cortisol Production Rate by Isotope Dilution Method.
W. Massalski. Apr 75, 10p NASA-TT-F-16285
Contract NASW-2481
Tran-Transl. Into English from Pol. Arch. Med. Wewn. (Poland), V. 4, No. 52, 1972 p 329-334.

Descriptors: *Body fluids, *Chemical analysis, *Cortisone, *Error analysis, *Radioactive isotopes, Adrenal metabolism, Biochemistry, Chromatography, Circadian rhythms, Enzyme activity, Human body.

For abstract, see STAR 1314

N75-23147/2GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
The Effect of Tryptophan on the Somatotropic Hormone During Sleep in Schizophrenics.
L. Murri, G. Cerone, F. Feriozzi, G. M. Mancini, and A. Nurzia. May 75, 8p NASA-TT-F-16280
Contract NASW-2483
Tran-Transl. Into English from Boll. Soc. Ital. Biol. Sper. (Naples), V. 49 , No. 24, 30 Dec. 1973 p 1490-1495.

Descriptors: *Hormone metabolisms, *Patients, *Schizophrenia, *Tryptophan, Mental health, Psychophysiology, Psychotherapy, Rhythm (Biology), Sleep.

For abstract, see STAR 1314

6B. Bioengineering

PAT-APPL-574 218/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Pasadena Office, Calif.
Myocardium Wall Thickness Transducer.
Patent Application.
C. Feldstein, G. W. Lewis, R. H. Silver, and V. H. Culler. Filed 5 May 75, 15p NASA-CASE-NPO-13644-1
Contract NAS7-100
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Myocardium, *Transducers, Cardiology, Epicardium, Medical equipment, *Patent applications, Physiological tests, Strain gages.

The design of an improved transducer for measuring myocardium wall thickness changes is discussed. A sensitive strain gauge is bonded to the beam to sense changes in the tension. The working end of the spike is inserted through the epicardium into the myocardium. As the heart contracts, larger beam-deforming forces are applied to the beam. Increased beam tension is sensed by the strain gauge and recorded.

6C. Biology

AD-A011 346/4GA PC$3.75/MF$2.25
Agricultural Research Service Gainesville Fla Biological Control Lab
The Biological Control of Alligatorweed,
Neal R. Spencer, and Jack R. Coulson. Mar 75, 26p

Descriptors: *Aquatic plants, *Biological control, Insects, Coleoptera, Damage, Inland waterways, Water pollution, Floods, Public health, Infestation, Test methods, Plant growth, Florida.
Identifiers: *Alternanthera philoxeroides, *Alligatorweeds, *Weed control, Agasicles hygrophila, Amyothrips andersoni, Vogtia malloi, Predation.

Alligatorweed, Alternanthera philoxeroides, an aquatic amaranth introduced into the United States from South America around the turn of the century, has become a noxious aquatic weed over the past 40 years. Three insects appeared suitable for introduction into the United States as biological control agents of alligatorweed. These insects are: (1) Agasicles hygrophila, (Coleoptera: Chrysomelidae), now commonly known as the 'alligatorweed flea beetle'; (2) Amynothrips andersoni (Thysanoptera: Phlaeothripidae), the 'alligatorweed thrips'; and (3) V. malloi, the so-called 'alligatorweed stemborer'. A general discussion of the biology, feeding behavior, and resulting plant damage of these insects is given. Portions of this document are not fully legible.

COM-75-10701/1GA PC$4.75/MF$2.25
Wyoming Univ., Laramie.
Production of Carp in a Wyoming Lake.
Completion rept. 26 Jun 68-30 Jun 71,
Thomas J. Clifford. Aug 73, 89p NOAA-75051402
Contracts DI-14-17-0001-1917, DI-14-17-0001-2322
Doctoral thesis. Report on Commercial Fisheries Research and Development Act.

Descriptors: *Carp, *Fresh water fishes, *Ocean Lake, Fish harvesting, Commercial fishing, Habitability, Sampling, Abundance, Exploitation, Theses, Wyoming.
Identifiers: Cyprinus carpio, Castostomus commersoni, Castostomus catostomus, Local studies.

The commercial fishery potential of Ocean Lake, Wyoming, was investigated from August 1, 1969 to July 31, 1971. Principal fish species involved were the carp (Cyprinus carpio), white sucker (Catostomus commersoni) and the longnose sucker (Catostomus catostomus). The study determined the net production of the carp; made predictions of expected rates to exploitation; evaluated harvest techniques; and developed a sampling program to monitor changes occurring in the non-game and game fish populations that may be expected to occur during commercial exploitation.

COM-75-10707/8GA PC$3.25
Rhode Island Univ., Kingston. Dept. of Zoology.
Social Conditions Increase Intermolt Period in Juvenile Lobsters 'Homarus americanus',
J. Stanley Cobb, and George R. Tamm. 13 Sep 74, 6p Marine Reprint-36 NOAA-75051602
Grant NOAA-04-3-158-3
Pub. in Jnl. of Fisheries Research Board of Canada, v32 n12 p1941-1943 1974.

Descriptors: *Lobsters, Animal behavior, Life cycles, Aquaculture, Shellfish, Larvae, Crustacea, Physiology, Responses, Growth.
Identifiers: *Homarus americanus, Sea Grant program, *Molting, Reprints.

Little research has been done on the social aspect of communal rearing; however, social conditions as well as hormonal conditions have been shown to affect the molting of decapod crustaceans. The purpose of the experiments in this report was to determine whether the delay seen in larval lobsters is also found in juveniles. It was discovered that fifth and eleventh stage lobsters held in pairs showed significantly longer time between molts than did controls reared individually. In pairs the first animal to molt did not delay ecdysis in the fifth stage, but delayed up to 32 percent of the control molt period in the eleventh stage. In the fifth stage the second lobster to molt delayed up to 32 percent and in the eleventh stage up to 71 percent. Similar differences in time between molts covered to be a consistent strategy throughout all life stages of the lobster in response to communal situations.

COM-75-10712/8GA PC$5.25/MF$2.25
Wyoming Univ., Laramie.
Effects of a Simulated Harvest of Carp and White Suckers from Ocean Lake, Fremont County, Wyoming.
Completion rept. 1 Jul 71-30 Jun 74,
John G. Baughman. 1974, 110p NOAA-75051404
Contract NMFS-04-4-208-46
Master's thesis. Report on Commercial Fisheries Research and Development Act. Sponsored in part by Wyoming Game and Fish Dept., Cheyenne.

Descriptors: *Carp, *Fresh water fishes, *Fish harvesting, *Ocean Lake, Commercial fishing, Abundance, Habitability, Theses, Wyoming.

A simulated commercial harvest of carp and white suckers from Ocean Lake was conducted by the Wyoming Game and Fish Department Commercial Fisheries Crew during the summers of 1971-1973. A preharvest and harvest sampling program was used to monitor changes in the Ocean Lake Fishery resulting from the removal of carp and white suckers. The only changes in the Ocean Lake fishery resulting from the simulated harvest were a reduction in the number of white suckers and a shift in the sucker's population structure to smaller sizes and younger age groups. An increase in the abundance of aquatic vegetation coincided with the decrease in carp numbers. Recommendations are made concerning the development of a future commercial fishery for carp.

COM-75-10713/6GA PC$5.75/MF$2.25
Wyoming Univ., Laramie.
Mercury Concentrations in Muscle Tissues of Carp Collected from Thirteen Wyoming Habitats.
Completion rept. 1 Jul 71-30 Jun 74,
Robert A. McDowell. Aug 73, 144p NOAA-75051403
Contract NMFS-04-4-208-46
Master's thesis. Report of Commercial Fisheries Research and Development Act. Sponsored in part by Wyoming Game and Fish Dept., Cheyenne.

Descriptors: *Carp, *Mercury(Metal), *Muscles, Mercury poisoning, Wyoming, Tables(Data), Aquaculture, Chemical analysis, Fisheries, Body weight, Recommendations, Tissues(Biology), Water pollution.
Identifiers: Commercial fishing, Bioaccumulation, *Water pollution effects(Animals).

Muscle tissues of carp collected from 13 Wyoming habitats were analyzed for total mercury content, using the Coleman MAS-50 mercury analyzer system. Concentrations of mercury ranged from 0.002 to 0.62 ppm; averaging 0.12 ppm. In general, mercury levels were seen to increase with increasing body weight of the fish, but only four of the 13 habitats sampled showed a statistically significant (.05 level) relationship. The levels found were thought to represent natural background concentrations of mercury. The carp from these habitats can be considered safe for human consumption and, therefore, commercial exploitation.

COM-75-10715/1GA PC$3.25/MF$2.25
Idaho Dept. of Fish and Game, Boise.
Experimental Rearing of Anadromous Fish, Lemhi River Drainage, Idaho (Hayden Creek Research Station).
Completion rept. Jul 70-Jun 74,
Melvin Reingold. Mar 75, 25p NOAA-75050901

Descriptors: *Trout, *Salmon, *Aquaculture, Animal migrations, Ponds, Size separation, Standards, Mortality, Quality, Idaho.
Identifiers: Steelhead trout, Chinook salmon.

Dirt pond rearing of summer-run steelhead trout at the Hayden Creek Research Station showed that the percent of smolts produced was similar for both one-year and two-year reared fish. Fewer sub-smolts were produced in the two-year rearing cycle but this advantage was offset by the high incidence of nonmigrating sexually precocial males. Grading prior to placing steelhead in the ponds is necessary to prevent excessive size range and reduce pond mortality. Preliminary test rearing of early acquired steelhead indicates rearing these for one year may give maximum cost/benefit returns for smolt production. Future plans for the station include feed and grading experiments and investigation of techniques and procedures to increase the quantity and quality of the smolts produced at the station.

COM-75-10723/5GA PC$4.75/MF$2.25
Moss Landing Marine Labs., Calif.
California Cooperative Fisheries Investigations, Hydrographic Data Report: Monterey Bay, July to December 1974.
Technical pub.,
William W. Broenkow, Stephen R. Lasley, and George C. Schrader. 1975, 84p Contrib-45, CASUC-MLML-TP-75-1 NOAA-75050502

Descriptors: *Oceanographic data, *Aquaculture, *Monterey Bay, Oceanographic surveys, Squids, Oxygen, Salinity, Temperature, Ocean environments, Sampling, Nutrients, Tables(Data), California.
Identifiers: Sea Grant program, Loligo opalescens.

In July 1974, Moss Landing Marine Laboratories began the continuation of the biweekly hydrographic observations in Monterey Bay. Water, temperature, salinity, dissolved oxygen, and nutrient ions (phosphate, nitrate, ammonia, and reactive silica) are the elements that were sampled. The following changes were made in the sampling routine: (1) To facilitate squid (Loligo opalescens) studies, the observations were made at night; and (2) stations 1125 and 1154 were sampled in addition to the five stations originally used. These additional stations should provide important data of the nearshore environment.

COM-75-10724/3GA PC$3.75/MF$2.25
Moss Landing Marine Labs., Calif.

The Results of an Exploratory Fishing Cruise for 'Loligo Opalescens' in Southern and Central California June 5-25, 1974.
Technical pub.,
J. R. Raymond Ally, Ronald G. Evans, and Thomas W. Thompson. 1975, 28p Contrib-46, CASUC-MLML-TP-75-02 NOAA-75050501

Descriptors: *Squids, *Fishing grounds, North Pacific Ocean, Growth, Food chains, Reproduction(Biology), Abundance, Santa Cruz Island, Channel Islands, California.
Identifiers: Sea Grant program, Loligo opalescens, La Jolla(California).

An exploratory fishing cruise, extending from La Jolla to Santa Cruz and including the Channel Islands, initiated a major program of squid research. The program had the following objectives: To gather samples of market squid (Loligo opalescens) for population, growth, aging, and food chain studies; to locate potential new fishing grounds; to investigate methods for determining spawning intensity; and to gather data on oceanographic parameters of the spawning grounds. Fishable concentrations of squid were discovered in the areas between Cape San Martin and Partington Point, between Pfeiffer Point and Point Sur, and in Carmel Bay, heretofore unfished. Squid spawning off Santa Cruz Island was observed using an underwater observation chamber. Mating and feeding behavior were observed in shipboard aquaria.

COM-75-10783/9GA PC$3.75/MF$2.25
National Marine Fisheries Service, Seattle, Wash.
Pink Salmon, 'Oncorhynchus gorbusha', Tagging Experiments in Southeastern Alaska, 1938-42 and 1945.
Special scientific rept.,
Roy E. Nakatani, Gerald J. Paulik, and Richard Van Cleve. Apr 75, 47p NOAA-TR-NMFS-SSRF-686 NOAA-75052301
Prepared by Washington Univ., Seattle. Coll. of Fisheries, Contrib-401. Paper copy also available from GPO as C55.13:NMFS-SSRF-686.

Descriptors: *Salmon, *Animal migrations, Marking, Identifying, Survival, Chatham Strait, Icy Strait, Alaska.
Identifiers: Oncorhynchus gorbuscha.

A total of 20,532 pink salmon (Oncorhynchus gorbuscha) were tagged and released in southeastern Alaska from 1938 to 1942, and in 1945. The recovery of 7,027 tags in the fish traps confirmed that the pink salmon stocks of the northern part of southeast Alaska are separate from those in the southern part. They also show that pink salmon enter the northern part of southeast Alaska through two paths: Through Icy Strait, and through the lower end of Chatham Strait. Differences were noted between the movements of fish in odd and even years. Also a larger proportion of earlier tagged fish moved to recovery locations farther inland. Migration rates were studied by plotting the catch per trap as well as by the recovery of tags. Survival rates computed for thirty releases with total tag recovery periods of two or more weeks averaged 0.384.

COM-75-10784/7GA PC$7.00/MF$2.25
National Marine Fisheries Service, Seattle, Wash.
Phytoplankton Pigment and Production Measurements in the California Current Region, 1969-72.
Data rept.,
R. W. Owen, Jr., and C. K. Sanchez. Nov 74, 188p NOAA-NMFS-DR-91 NOAA-75052102
Prepared by National Marine Fisheries Service, La Jolla, Calif. Southwest Fisheries Center.

Descriptors: *Phytoplankton, *Fishes, *North Pacific Ocean, Sampling, Primary biological productivity, Algae, Ocean environments, Measuring instruments, Tables(Data), Aquatic microbiology, California.

Phytoplankton production, standing stocks, and some relevant environmental characteristics were for the first time systematically measured in the California Current system during the period from 1969 through 1972. The report describes the systems and methods of measurement, and presents the data obtained.

COM-75-10787/0GA PC$11.25/MF$2.25
National Marine Fisheries Service, Portland, Oreg. Columbia River Fisheries Program Office.
Releases of Anadromous Salmon and Trout from Pacific Coast Rearing Facilities, 1960 to 1973.
Data rept.,
Robert R. Vreeland, Roy J. Wahle, William D. Parente, and Paula J. Jurich. Apr 75, 449p NMFS-Data-101 NOAA-75052903

Descriptors: *Salmon, *Trout, *Fisheries, Reproduction(Biology), Breeding, Ponds, Weight(Mass), Size determination, Salt water, Canada, Alaska, British Columbia, Washington(State), Idaho, Oregon, California, North Pacific Ocean.
Identifiers: Oncorhynchus, Salmo.

Releases of anadromous salmon, Oncorhynchus spp., and trout, Salmo spp., from all rearing facilities in Alaska, British Columbia, Washington, Idaho, Oregon, and California are listed for the years 1960 through 1973. A total of 113 hatcheries, 42 rearing ponds, and two saltwater rearing pens released anadromous salmon and trout at some time during this 14-year period. The species of fish, brood year, number, weight and size of fish released, date of release, and release location are presented by rearing facility.

COM-75-50192-02/GA
PC-GPO/MF$2.25-NTIS
National Marine Fisheries Service, Seattle, Wash.
Fishery Bulletin, Volume 73, Number 2, April 1975.
Quarterly rept.,
Reuben Lasker. Apr 75, 257p NOAA-75051501
Paper copy available from GPO.

Descriptors: *Periodicals, *Fisheries, Marine biology, Biochemistry, Ecology, Aquatic biology, Economics.
Identifiers: Sea Grant program.

Seventeen articles, abstracted separately, are included in this issue. Topics include investigations in marine biology, biochemistry, ecology, morphology, and economics.

COM-75-50192-02-01/GA
(Order as COM-75-50192-02)
Smithsonian Tropical Research Inst., Balboa, Canal Zone.
Heat Exchange in the Yellowfin Tuna, 'Thunnus albacares', and Skipjack Tuna, 'Katsuwonus pelamis', and the Adaptive Significance of Elevated Body Temperatures in Scombrid Fishes.
Jeffrey B. Graham. Aug 74, 12p NOAA-75051501-1
Included in Fishery Bull., v73 n2 p219-229 Apr 75.

Descriptors: *Fishes, *Tunas, *Thermoregulation, *Body temperature, Adaption, Metabolism, Physiology, Morphology(Biology), Swimming.
Identifiers: Thunnus albacares, Katsuwonus pelamis, Yellowfin tuna, Skipjack tuna.

Thunnus albacares and Katsuwonus pelamis are warm-bodied fish and use retia mirabilia as counter-current heat exchangers. The adaptive significance of the specialization for heat conservation is discussed. Body temperatures, thermal profiles, and the natural histories of different warm-bodied species are compared, and warm fishes are contrasted with scombrids that do not conserve heat. The skipjack tunas, Euthynnus and Katsuwonus have well-developed central heat exchangers and are much warmer than T. albacares. Comparsions on the basis of existing knowledge about the two phyletic groups of Thunnus reveal few differences in swimming ability or factors related to locomotion. The bluefin group, consisting of T. Thynnus, T. maccoyii, and T. alalunga, however, does contrast with the yellowfin group (T. albacares, T. atlanticus, and T. tonggol) by maintaining generally higher body temperature differentials, having incomplete vertebral circulation through the absence of a posterior cardinal vein, and occurring at higher latitudes.

COM-75-50192-02-03/GA
(Order as COM-75-50192-02)
Rosenstiel School of Marine and Atmospheric Science, Miami, Fla. Div. of Biology and Living Resources.
Production of Two Planktonic Carnivores (Chaetognath and Ctenophore) in South Florida Inshore Waters,
M. R. Reeve, and L. D. Baker. Jun 74, 12p NOAA-75051501-3
Grant NSF-GA-28522
Included in Fishery Bull., v73 n2 p238-248 Apr 75.

Descriptors: *Zooplankton, *Carnivora, Seasonal variations, Aquatic animals, Plankton, Florida, Biological productivity, Biomass, Marine biology, Biscayne Bay, Card Sound.
Identifiers: Sagitta hispida, Mnemiopsis mccradyi.

Seasonal changes in biomass and production of two planktonic carnivores, Sagitta hispida Conant and Mnemiopsis mccradyi Mayer, were followed in a subtropical inshore marine environment. Production was estimated as the product of mean daily biomass (calculated from the sampled biomass and computed mortality rates) and daily growth rate. The latter was determined from laboratory culture experiments at three temperatures. Seasonal fluctuations of ctenophore biomass and production were much greater than those of chaetognaths. Mean daily production in milligram carbon per square meter was 2.00 and 4.80 for Sagitta in Card Sound and Biscayne Bay respectively, and 1.01 for Mnemiopsis in Biscayne Bay. Average production/biomass ratios were 0.31 for Sagitta and 0.12 for Mnemiopsis.

COM-75-50192-02-04/GA
(Order as COM-75-50192-02)
Hawaii Inst. of Marine Biology, Honolulu.
Effects of Acclimation on the Temperature and Salinity Tolerance of the Yolk-Sac Larvae of 'Bairdiella icistia' (Pisces: Sciaenidae),
Robert C. May. Jun 74, 8p NOAA-75051501-4
Sponsored in part by National Marine Fisheries Service, La Jolla, Calif. Southwest Fisheries Center, and California Univ., San Diego, La Jolla. Inst. of Marine Resources.
Included in Fishery Bull., v73 n2 p249-255 Apr 75.

Descriptors: *Fishes, *Larvae, *Acclimatization, *Heat tolerance, Tolerances(Physiology), Temperature, Salinity, Marine biology.
Identifiers: Bairdiella icistia.

Eggs of the bairdiella, Bairdiella icistia, were fertilized and incubated in various combinations of temperature and salinity, and the salinity and upper thermal tolerances of the yolk-sac larvae were determined. The upper thermal tolerance was enhanced by acclimation to high temperatures and low salinities. Acclimation to

low salinities enhanced the lower salinity tolerance of larvae at 24 h after exposure to test conditions, but an acclimation effect on the upper salinity tolerance was not apparent until 48 h after exposure. Yolk-sac bairdiella larvae are more tolerant than the embryonic stages and less tolerant than adults to extremes of temperature and salinity.

COM-75-50192-02-05/GA
(Order as COM-75-50192-02)
Delaware Univ., Newark. Dept. of Economics.
The Interaction of Economic, Biological, and Legal Forces in the Middle Atlantic Oyster Industry,
Richard J. Agnello, and Lawrence P. Donnelley. Aug 74, 7p NOAA-75051501-5
Included in Fishery Bull., v73 n2 p256-261 Apr 75.

Descriptors: *Oysters, *Fisheries, Shellfish, Economic factors, Industries, Marine biology, Law(Jurisprudence), Statistical analysis, Demand(Economics), Prices, Income, Marketing, Atlantic Ocean.
Identifiers: Sea Grant program.

Economic, environmental, and legal forces are contributing factors in the decline of the Middle Atlantic oyster industry. This paper determines the interactions and importance of these forces by quantifying and integrating some of the relevant variables into a supply and demand model of the oyster industry. The statistical results yield significant and expected parameter values with useful information on price and income demand elasticities. Also implications of common property legal frameworks on resource utilization are revealed. The main conclusions are that efforts to rehabilitate the industry by cleaning up pollution, replacing clutch, and encouraging legal private property rights may have large social values.

COM-75-50192-02-06/GA
(Order as COM-75-50192-02)
Scripps Institution of Oceanography, La Jolla, Calif.
The Reproductive Biology of the Protogynous Hermaphrodite 'Pimelometopon pulchrum' (Pisces: Labridae),
Robert R. Warner. Jul 74, 23p NOAA-75051501-6
Included in Fishery Bull., v73 n2 p262-283 Apr 75.

Descriptors: *Fishes, *Reproduction(Biology), *Hermaphroditism, Ovary, Reproductive system, Marine biology, Fecundity, Breeding, Dwarfism, Sex, Catalina Island, Guadalupe Island, California, Mexico.
Identifiers: Pimelometopon pulchrum.

Pimelometopon pulchrum, California sheephead, a labrid fish of the eastern Pacific Ocean, was collected the year round at Catalina Island, California, and comparative material was taken at Guadalupe Island, Mexico. Individuals at Guadalupe were dwarfed relative to those at Catalina. P. pulchrum is a protogynous hermaphrodite, the ovarian elements undergoing massive degeneration as spermatogenic crypts proliferate in the gonads of transitional individuals. Sexual changes occur between breeding seasons. Sexual transformation occurs earlier on the average at Guadalupe. Spawning appears to occur in July, August, and September in the Catalina population. Individuals probably spawn several times in a breeding season. Ovary weight increases in a linear fashion with age in the Catalina population. The rate of increase with age would be less in the Guadalupe population due to dwarfing.

COM-75-50192-02-07/GA
(Order as COM-75-50192-02)
Scripps Institution of Oceanography, La Jolla, Calif.
An Inverse Correlation Between Meristic Characters and Food Supply in Mid-Water Fishes: Evidence and Possible Explanations,
Robert Karl Johnson, and Michael A. Barnett. Jul 74, 16p NOAA-75051501-7
Grant NSF-GB-7596
Prepared in cooperation with Field Museum of Natural History, Chicago, Ill. Div. of Fishes.
Included in Fishery Bull., v73 n2 p284-298 Apr 75.

Descriptors: *Fishes, *Food supply, *Biological productivity, Larvae, Development, Growth, Food chains, Zooplankton, Salinity, Temperature.
Identifiers: Chauliodus sloani, Diplophos taenia, Pollichthys mauli, Vinciguerria lucetia, Vinciguerria nimbaria.

In five species of mid-water fishes, Chauliodus sloani, Diplophos taenia, Pollichthys mauli, Vinciguerria lucetia, and V. nimbaria, the central values of meristic counts (anal fin rays, vertebrae, longitudinal photophore rows) and three measures of biological productivity (phosphate-phosphorus concentration, net primary production, zooplankton standing stocks) are correlated negatively. For the species and areas studied the meristic variation observed cannot be related to temperature, salinity, dissolved oxygen, or any other physical or chemical factor known to affect meristic variation in fishes. It is hypothesized that this relationship between meristic counts and measures of food availability involves differences in egg size, fecundity, size at hatching, and size at comparable stages of larval development between populations in different areas.

COM-75-50192-02-10/GA
(Order as COM-75-50192-02)
National Marine Fisheries Service, Highlands, N.J. Sandy Hook Lab.
Geographic and Hydrographic Distribution of Atlantic Menhaden Eggs and Larvae Along the Middle Atlantic Coast from RV 'Dolphin' Cruises, 1965-66,
Arthur W. Kendall, Jr, and John W. Reintjes. Aug 74, 20p NOAA-75051501-10
Prepared in cooperation with National Marine Fisheries Service, Beaufort, N.C. Atlantic Estuarine Fisheries Center.
Included in Fishery Bull., v73 n2 p317-335 Apr 75.

Descriptors: *Fishes, *Breeding, Distribution(Property), Larvae, Temperature, Salinity, Animal migrations, Seasonal variations, Diurnal variations.
Identifiers: Brevoor*ia tyrannus, *Menhaden, Spawning.

Atlantic menhaden, Brevoortia tyrannus, eggs and larvae were collected during eight ichthyoplankton cruises from December 1965 to December 1966. On each cruise tows were made with a Gulf V plankton net at 92 stations along 14 transects from the coast to the edge of the continental shelf from Martha's Vineyard, MA, to Cape Lookout, NC. Seasonal shifts in geographic pattern of larvae indicated spawning started in summer of New Jersey and New York, became widespread in Middle Atlantic Bight in fall, and continued into winter off North Carolina. Larvae were equally distributed in shallow (0-15 m) and deep (18-33 m) tows during night and day. Larvae occurred over a water temperature range from 0 to 25C and a salinity range of 29 to 36 degrees/00. Seasonal distribution of larvae suggests some of the annual variation in year classes may be due to cold-related mortality of larvae entering middle Atlantic estuaries in late fall.

COM-75-50192-02-11/GA
(Order as COM-75-50192-02)
National Marine Fisheries Service, Seattle, Wash. Northwest Fisheries Center.
Age and Growth of Pacific Hake, 'Merluccius productus',
Thomas A. Dark. Aug 74, 21p NOAA-75051501-11
Included in Fishery Bull., v73 n2 p336-355 Apr 75.

Descriptors: *Fishes, Growth curves, Growth, Age, Distribution(Property), North Pacific Ocean.
Identifiers: Merluccius productus, *Pacific hake.

The age and growth of Pacific hake, Merluccius productus, collected off California, Oregon, and Washington in 1964-69, were studied. The age determination procedure was examined and considered to provide valid ages. Relative size of the year class and sampling area (average age tends to increase with latitude) contribute substantially to the variation of the population age composition while sex and sampling season have lesser effects. Growth in length is rapid during the first three years after which it slows and approaches an asymptote in the oldest ages, 10-13 years. Females have a faster rate of growth than males and tend to survive 2 or 3 years longer, to age 13. Males attain an average weight of about 1,211 g by age 11 and females reach an average weight of 1,374 g by age 13. Annual instantaneous growth rates in weight were computed and were found to decrease most during the fourth year for both sexes and very little growth occurred after the sixth year for males or after the ninth year for females.

COM-75-50192-02-12/GA
(Order as COM-75-50192-02)
Bureau of Sport Fisheries and Wildlife, Stuttgart, Ark. Fish Farming Experiment Station.
Evaluation of the Return of Adult Chinook Salmon to the Abernathy Incubation Channel,
Allan E. Thomas. Jul 74, 5p NOAA-75051501-12
Included in Fishery Bull., v73 n2 p356-359 Apr 75.

Descriptors: *Salmon, *Fisheries, Fishes, Breeding, Sampling, Surveys, Survival, Marking, Animal migrations, Abernathy Creek, Washington(State).
Identifiers: *Chinook salmon, Oncorhynchus tshawytrcha, Hatcheries.

Adult returns of progeny of the 1964 year class of chinook salmon, Oncorphynchus tshawytscha, were determined for the Abernathy incubation channel, natural production, and hatchery sources. A total of 4,620,600 fry were released from the channel into Abernathy Creek (WA) as unmarked fry. Natural production in the creek was estimated at 16,700 fry, or 0.36% of the total unmarked fish. A total of 557,649 hatchery fish were marked by feeding tetracycline, and 161,579 were both finclipped and fed tetracycline. Returns from hatchery sources were 506 fish or 0.070%. Egg potential was 76% of the original 1,142,604 eggs. Returns from the channel totaled 733 fish or 0.016%. Egg potential was 35% of the orginial 5,888,048 eggs. Returns attributed to Abernathy Creek totaled only three fish and egg potential was 0.2% of the orginial 2,880,000 eggs. Survival of this year class was considerably below the 9-year average of 0.118%.

COM-75-50192-02-15/GA
(Order as COM-75-50192-02)
California Univ., San Diego, La Jolla. Inst. of Marine Resources.
Distribution and Ecology of Skipjack Tuna, 'Katsuwonus pelamis,' in an Offshore Area of the Eastern Tropical Pacific Ocean,
Maurice Blackburn, and Francis Williams. Jun 74, 31p NOAA-75051501-15
Contracts DI-14-17-0007-989, DI-14-17-0001-2311
Included in Fishery Bull., v73 n2 p382-411 Apr 75.

Descriptors: *Tunas, *Ecology, *Fishes, Distribution(Property), Pacific Ocean, Larvae, Adults, Animal migrations, Animal behavior, Marine biology.
Identifiers: *Skipjack tuna, Katsuwonus pelamis.

Distributions of skipjack tuna, katsuwonus pelamis, were studied in the offshore eastern tropical Pacific between lat. 15 degrees N and 5 degrees S, long. 115 degrees and 125 degrees W, during two cruises in 1970 and 1971. Another cruise was made there with different methods in 1969. All cruises were between October and April. Various environmental properties were measured. Catches of skipjack included fish smaller and larger than those generally taken near the American coast. This is consistent with previous hypotheses that mature adults and their larvae generally occur far offshore, whereas adolescents are generally coastal, in the Eastern Pacific. The juveniles arriving near the coast and the older fish leaving it evidently cross the studied area on migrations from and to the spawning regions.

COM-75-50192-02-16/GA
(Order as COM-75-50192-02)
Nuclear Regulatory Commission, Washington, D.C. Div. of Technical Review.
Reproduction and Recruitment of the Brackish Water Clam 'Rangia cuneata' in the James River, Virginia,
Thomas D. Cain. May 74, 20p NOAA-75051501-16
Sponsored in part by Virginia Electric and Power Co., Richmond. Also pub. as Virginia Inst. of Marine Science, Gloucester Point. VIMS-Contrib-582.
Included in Fishery Bull., v73 n2 p412-430 Apr 75.

Descriptors: *Clams, Shellfish, Reproduction(Biology), James River, Virginia, Breeding, Aquatic animals, Salinity.
Identifiers: Rangia cuneata.

Reproduction and recruitment of the brackish water clam Rangia cuneata were investigated in the James River, Virginia, from February 1970 to January 1972. Histological examinations of gonads were made, newly set clams were collected, and temperature and salinity measurements were taken from three populations living in different salinity regimes. Gametogenesis began in April and ripe gonads were found from May to late November with no inactive period. Gametogenesis ceased in December through March as residual gametes were cytolyzed. Temperature was important in initiating gametogenesis in the spring and midsummer. Spawning correlated best with changes in salinity to approximately .5%. Over its estuarine range, salinity has a controlling effect on Rangia spawning and recruitment. Seasonal reduction in input of freshwater (increased seawater intrusion) is needed to induce spawning and recruitment in upstream populations. Best recruitment occurred to the middle of the habitat range which has an annual salinity change from fresh to .5%.

COM-75-50192-02-17/GA
(Order as COM-75-50192-02)
National Marine Fisheries Service, Narragansett, R.I. Narragansett Lab.
Hormonal-Induced Ovulation of the Winter Flounder, 'Pseudopleuronectes americanus',
Alphonse S. Smigielski. Jun 74, 9p NOAA-75051501-17
Included in Fishery Bull., v73 n2 p431-438 Apr 75.

Descriptors: *Fishes, *Hormones, Reproduction(Biology), Gonadotropic hormones, Larvae, Aquatic animals.
Identifiers: Pseudopleuronectes americanus, Flounders, Spawning.

The response of winter flounder, Pseudopleuronectes americanus, to human chorionic gonadotropin (HCG), oxytocin, pregnant mare serum gonadotropic (PMSG), deoxycorticosterone (DOCA), and freeze-dried carp pituitary is described. HCG and PMS were successful in some instances in producing viable eggs and larvae while carp pituitary was successful in all instances. These were the first known successful attempts to induce maturation and spawning of winter flounder artificially in the laboratory. Larvae obtained from these hormonal-induced spawnings were normal in all respects and were reared in the laboratory through metamorphosis. Wind plankton obtained from Narragansett Bay, brine shrimp nauplii, and chopped clams were fed as food. The early life history of this flatfish can, for the first time, be completed under controlled laboratory conditions.

JPRS-64773 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Dolphin Training,
Aleksandr Malinov, and L. Lebedev. 16 May 75, 12p
Trans. of Nedelya (USSR) n37 p6-7, 9-15 Sep 74; Pravda, Moscow (USSR) p4, 10 Nov 74.

Descriptors: *Dolphins(Mammals), Aquatic animals, Animal behavior, Marine biology, USSR, Translations.
Identifiers: *Marine mammals.

The report contains a description of dolphin activities in captivity and when free.

JPRS-64826 PC$3.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Genetic Engineering and Ecology,
N. V. Turbin, and I. B. Novik. 22 May 75, 26p
Trans. of Voprosy Filosofii (USSR) n1 p47-56, 110-115 1975.

Descriptors: *Genetics, *Ecology, Sociology, Heredity, USSR, Translations, Humans, Bioengineering.
Identifiers: Molecular biology.

Contents:
Genetic engineering--reality, perspectives and dangers;
The future of science and the ecological problem.

PB-242 023/0GA PC$6.25/MF$2.25
Michigan State Univ., East Lansing. Inst. of Water Research.
Community Productivity and Energy Flow in an Enriched Warm-Water Stream.
Red Cedar River Series rept. no. 7 (Final),
Robin L. Vannote, and Robert C. Ball. Sep 72, 169p MSU-IWR-TR-72-0027
Grant PHS-RG-5345
Sponsored in part by Michigan Dept. of Natural Resources, Lansing. Fisheries Div.

Descriptors: *Biological productivity, *Red Cedar River, Dissolved gases, Oxygen, Algae, Crayfishes, Ecology, Biochemical oxygen demand, Nutrients, Bass, Food chains, Biomass, Growth, Michigan.
Identifiers: Trophic level.

The productivity and energetics in the enrichment zone of a warm-water smallmouth bass stream were investigated. Biotic and abiotic energy losses were quantified in tracing the energy flow pattern from the primary trophic level, through the crayfish population, and ultimately to the smallmouth bass population. The Red Cedar River presents an ecosystem of complex interactions of photosynthesis, circulation, and total community respiration. These dynamic properties of the ecosystem vary seasonly in their intensity and certain components are either stimulated or depressed through man's activities. The inflow of organic matter, washed from the watershed during periods of runoff, increases the respiration compartment.

PB-242 511/4GA PC$4.75/MF$2.25
Nebraska Univ., Lincoln. Dept. of Chemical Engineering.
Growth of the Blue-Green Alga 'Microcystis aeruginosa' Under Defined Conditions.
Master's thesis,
Shinji Goto. Sep 72, 97p W75-08579, OWRT-A-020-NEB(2)
Contract DI-14-31-0001-3527

Descriptors: *Algae, *Growth, Culture media, Bacteria, Inorganic phosphates, Inorganic nitrates, Cyanophyta, Lakes, Symbiosis, Carbon dioxide, Oxygen, Theses.
Identifiers: Eutrophication, Microcystis aeruginosa, Algal blooms.

The research attempts to determine the limiting factors for growth of the blue-green alga, Microcystis aeruginosa, which causes massive algal blooms in lakes, by growing it in continuous culture under controlled conditions on a synthetic medium. By monitoring and controlling medium flow rate, feed nutrient concentrations of phosphate and nitrate, light intensity, and air or enriched carbon dioxide flow rate, it is possible by employing two-species, as well as one-species culture, to determine the limiting concentrations of each component for the algae or the algae and bacteria. Results from continuous cultures of the alga as well as preliminary work on both the bacteria and algae are reported.

PB-242 764/9GA PC$3.75/MF$2.25
Bureau of Sport Fisheries and Wildlife, Yankton, S. Dak. North Central Reservoir Investigations.
Studies to Determine Methods for Culturing Three Freshwater Zooplankton Species.
Final rept.,
Dan B. Martin, and Jerry F. Novotny. May 75, 43p EPA/660/3-75-010

Descriptors: *Zooplankton, *Culture media, *Fishes, Feeding stuffs, Bioassay, Fresh water biology, Cladocera, Crustacea, Test methods, Mortality, Laboratories.
Identifiers: Bosmina longirostris, Chydorus sphaericus, Cyclops bicuspidatus.

Studies to determine laboratory methods for culturing unispecific populations of Bosmina longirostris, Chydorus sphaericus and Cyclops bicuspidatus thomasi were carried out. These cultures are to provide a source of animals to be used as live food for fish and as bioassay test organisms. High mortalities, apparently associated with the phenomenon of 'air-locking,' always occurred during handling in the laboratory. C. sphaericus was successfully maintained in relatively dense cultures (approximately 1,000 per liter) using a mixture of dried foods, less than 37 microns in size. One-fourth of the standing crop was harvested each week without apparently reducing the production in the culture. C. sphaericus was recommended as being best suited for live fish food and as a bioassay test animal.

TT-73-55111 PC$9.25/MF$2.25
National Science Foundation, Washington, D.C. Office of Polar Programs.
Development Trends in Methods Used to Model Populations and Communities,
V. V. Mehshytkyh. 1975, 310p
Trans. of mono. Matematyieckoe Modeyiipobahe Popylyatsyi i Choobshchectb Bodhbix Zhybothbix, Leningrad, 1971 195p by Irene Allard. Sponsored in part by National

Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Biological productivity, *Aquatic animals, *Ecology, Mathematical models, Fresh water biology, Lakes, Mortality, Populations, Fishes, Forecasting, Difference equations, Translations, USSR.
Identifiers: Ecosystems, Trophic level.

The purpose of the report is to analyze a theory of productivity applied to populations and communities of aquatic animals in the fresh water ecological system.

TT-74-53257 PC$3.25/MF$2.25
Agricultural Research Service, Washington, D.C.
Ceratina and its Parasites (Treratiny i ich Parazity),
S. I. Malyshev. 1975, 6p
Trans. from Leningradskoe Obshchestvo Estestvoispytatelei. Trudy (USSR) v43 n1 1912. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Bees, *Insects, USSR, Translations, Hymenoptera, Larvae, Parasites, Entomology.
Identifiers: Xylocopa, Ceratina.

The report summarizes the nesting habits, reproduction, and parasites of Ceratina, a genus of bees.

TT-74-53272 PC$3.25/MF$2.25
Agricultural Research Service, Washington, D.C.
Warble Flies Infesting the Cattle in the Mongolian People's Republic (Podkozhnee Ovoda Krupnogo Rogatogo Skota v Mongolskoe Narodnoe Respublike),
C. Dorzh, and J. Minar. 1975, 19p
Trans. of Parazitologiya (USSR) v5 p26-32 1971. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Diptera, *Cattle, Insects, Parasites, Distribution(Property), USSR, Translations, Seasonal variations, Ecology, Larvae.
Identifiers: Warble fly, Hypoderma bovis, Mongolia.

The paper contains new data on the occurrence and bionomy of cattle warble flies (Diptera, Hypodermatidae) in the Mongolian People's Republic. The degree of infestation, ecological factors and seasonal dynamics as well as the distribution and species composition of the warble flies were studied in the main pasture regions. The southern boundary line of distribution of the predominant species Hypoderma bovis was found to coincide with the geobotanical line of the steppe and semi-desert zones.

6D. Bionics

AD-A011 369/6GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
Force Feedback in Precise Assembly Tasks,
Hirochika Inoue. Aug 74, 31p Rept no. AI-M-308
Contract N00014-70-A-0362-0005

Descriptors: *Robots, Production engineering, Computer programming, Artificial intelligence, Performance.
Identifiers: *Assembly lines, Mass production.

This paper describes the execution of precise assembly tasks by a robot. The level of performance of the experimental system allows such basic actions as putting a peg into a hole, screwing a nut on a bolt, and picking up a thin piece from a flat table. The tolerance achieved in the experiments was 0.001 inch. The experiments proved that force feedback enabled the reliable assembly of a bearing complex consisting of eight parts with close tolerances.

JPRS-64941 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Philosophical and Psychological Problems of Artificial Intelligence,
O. K. Tikhomirov. 6 Jun 75, 21p
Trans. of Voprosy Filosofii (USSR) n1 p97-109 1975.

Descriptors: *Artificial intelligence, USSR, Translations, Bionics, Learning machines, Heuristic methods, Philosophy, Psychology, USSR, Translations.

The following topics are discussed: Artificial intelligence as a scientific direction; Heuristic search theory and the psychology of intelligence; Prospects for improving artificial intelligence; Artificial intelligence and materialism; Artificial intelligence and theoretical problems of psychology.

6E. Clinical Medicine

AD-A011 137/7GA PC$3.75/MF$2.25
Jefferson Medical Coll Philadelphia Pa
Pathogenesis of Acute Diarrheal Disease.
Final scientific rept.,
Abram S. Benenson, and Russell W. Schaedler. 1974, 49p
Contract N00014-68-A-0516

Descriptors: *Gastrointestinal diseases, *Diarrhea, *Pathogenic microorganisms, Pathogenesis, Microflora, Microorganisms, Viruses, Patients, Clinical medicine.
Identifiers: Chronic diseases, Themis project.

The microflora at various sites in the alimentary tract of patients with acute and chronic diarrheal disease was compared with that in normal controls. The protocols included the search for frank pathogens and suspicious isolates as well as for subtle changes in the balance of microflora in the small bowel and feces of affected patients. Longitudinal studies were performed on normal subjects to test the stability of the microflora and on patients to relate shifts in microflora to changes in the clinical status.

AD-A011 293/8GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Mitogen-Stimulated Lymphocyte Inhibition by Supernatants of Crowded Lymphocytoblasts.
Medical research progress rept.,
Stanley S. Green, Richard Wistar, Jr., and Kenneth W. Sell. 30 May 74, 10p
Availability: Pub. in Transplantation, v18 n6 p496-502 1974.

Descriptors: *Lymphocytes, *Inhibitors, Inhibition, Gels, Permeability, Ion exchange, Immunity, Transplantation, Reprints.
Identifiers: Blastogenesis, Lymphocytoblasts, Mitogens.

An inhibitor of blastogenesis has been found in supernatants of cultured lymphocytoblasts grown under crowded conditions. It was produced maximally at a concentration of 1 million cells/sq cm. This inhibitor suppresses the in vitro response of normal human peripheral blood lymphocytes to the mitogens phytohemagglutinin, pokeweek, and concanavalin A, as well as allogeneic cells. By itself it is neither stimulating nor cytotoxic. The inhibitor has been characterized by size on gel chromatography and its elution pattern places it in a molecular weight range of 40,000-70,000. The inhibitor is stable at 56 C for 30 min and labile at 80 C for 30 min. Treatment at pH 2.4 caused complete loss of activity, while the other pH levels had less or no effect.

AD-A011 294/6GA PC$3.25/MF$2.25
Naval Health Research Center San Diego Calif
Alcoholism in Navy and Marine Corps Women: A First Look,
Marc A. Schuckit, and E. K. Eric Gunderson. 1975, 7p Rept no. 73-28
Availability: Pub. in Military Medicine, v140 n4 p268-271 Apr 75.

Descriptors: *Alcoholism, *Females, Naval personnel, Marine Corps personnel, Behavior, Identification, Diagnosis(Medicine), Reprints.

Naval service women hospitalized for alcoholism between July 1965 and December 1971 were evaluated through a record review. The enlisted women were grossly heterogeneous and fell into a younger group (mean age 20.2 years) presenting disciplinary problems and an older group (mean age 37.0 years) who tended to show both depression and alcoholism. The majority of the younger enlisted women did not fulfill independent criteria for the diagnosis of alcoholism. The older enlisted women and the naval women officers resembled the civilian picture of the woman alcoholic. The importance of distinguishing primary and secondary alcoholism is discussed. (Author)

AD-A011 301/9GA PC$3.25/MF$2.25
Army Medical Research Inst of Infectious Diseases Frederick Md
Comparative Analysis of Members of the Venezuelan Equine Encephalomyelitis Virus Complex,
Carl E. Pedersen, Jr., and Gerald A. Eddy. 11 Jun 74, 9p
Availability: Pub. in American Jnl. of Epidemiology, v101 n3 p245-252.

Descriptors: *Venezuelan equine encephalomyelitis virus, Medical research, Biochemistry, Bioassay, Reprints.
Identifiers: Virus strains.

AD-A011 408/2GA PC$4.75/MF$2.25
Turku Univ (Finland) Dept of Medical Chemistry
Oxygen and Trauma. Studies on Pulmonary Oxygen Poisoning and the Role of Oxygen in Repair Processes.
Final technical rept. Dec 73-Dec 74,
Juha Niinikoski. Dec 74, 89p ARDG(E)-R/D-2026
Grant DA-ERO-124-74-G-0011
See also report dated Nov 73, AD-777 004.

Descriptors: *Oxygen, Laboratory animals, Experimental data, Lung, Collagen, Toxicity, Therapy, Tissues(Biology), Healing, Finland, Metabolism, Wounds and injuries, Hyperbaric medicine, Physiology Carbon dioxide.
Identifiers: *Oxygen toxicity, Hyperbaric oxygenation.

Contents:
- Oxygen-induced changes in pulmonary phospholipids;
- Collagen metabolism in rat lungs during chronic intermittent exposure to oxygen;
- Determinations of local O2 and CO2 tensions by means of implanted silastic tube;
- Parenchymal gas tensions in dog lung;
- Intraperitoneal O2 and CO2 tensions in experimental adhesion disease and peritonitis;
- Energy metabolism of experimental wounds in various oxygen environments;
- Effect of hyperbaric oxygenation and prolonged hypoxia on healing of open wounds;
- Oxygen tensions in healing anastomosis of rabbit aorta.

AD-A011 428/0GA PC$10.50/MF$2.25
Naval Undersea Center San Diego Calif
Effect of Automation on Clinical Laboratory Testing Times.
Research and development rept. Apr 71-Apr 74,
Robert H. Riffenburgh. Nov 74, 413p Rept no. NUC-TP-439

Descriptors: *Clinical laboratories, *Test methods, Computerized simulation, Computer applications, Time, Patients, Automation, Tables(Data), Cost effectiveness, Quality control.
Identifiers: Evaluation, Recommendations, *Automated clinical laboratory systems, Medical computer applications.

Delays and bottlenecks in hospital patient treatment, occurring in the laboratory services, amy be reduced by automating the specimen transport to the laboratories and/or automating by computer the within-laboratory processing and the return of results. A computer simulation of such an automation was conducted for the Naval Hospital, San Diego, for 26 patient sources and five major laboratories. Results indicate that 'clinlab' time from patient to laboratory and back can be markedly and cost-effectively reduced by automation. Recommendations include computerized accessioning, computerized processing control in certain cases, computerized analysis, remote hard-copy display of results in wards, transitubing specimens, automated quality control, computerized compiling and filing of results, and automatic flagging of unusual test results.

AD-A011 444/7GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
A Comparison of Asanguineous Fluids and Whole Blood in the Treatment of Hemorrhagic Shock.
Medical research progress rept.,
Gerald S. Moss, H. J. Proctor, Louis D. Homer, Clifford M. Herman, and B. D. Litt. 1974, 12p
Pub. in Acute Fluid Replacement in the Therapy of Shock, p175-184 1974.

Descriptors: *Hemorrhagic shock, *Parenteral infusions, *Blood transfusion, Therapy, Saline solution, Albumins, Response(Biology), Baboons, Blood circulation, Metabolism.

The object of this comparative study was to evaluate the circulatory and Metabolic responses of baboons in a state of oligemic shock to treatment with 5% albumin in saline solution followed by shed red blood cells, or isotonic saline solution followed by shed red blood cells, or whole blood alone. Without treatment, the mortality for the baboons was 100%. With treatment, the survival rates between the groups were not significantly different. The saline solution treatment group required 4.1 times the volume of shed blood, while the other groups required approximately 1.4 times the volume of shed blood. While there were some initial differences, by the end of the final resuscitation period, no significant differences were noted in cardiac output, pulmonary and peripheral vascular resistances, serum lactate, arteriovenous pO2 gradient difference, or arterial pressure.

AD-A011 450/4GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Gastric Secretory Response to Acute Isotonic Hypervolemia.
Medical research progress rept.,
Avram R. Kraft, Arnold G. Coran, Louise D. Homer, and Clifford M. Herman. 1974, 6p
Pub. in the American Jnl. of Surgery, v128 p624-627 1974.

Descriptors: *Body fluids, *Blood plasma, *Gastric juice, Volume, Secretion, Physiology, Gastrin, Parenteral infusions.
Identifiers: *Hypervolemia.

The effects of acute isotonic extracellular fluid volume expansion were studied in conditioned, anesthetized dogs who underwent pyloric ligation and creation of an external gastric fistula. A hypervolemic state was produced with intravenous Ringer's lactate solution. The canine stomach responded as a 'third-kidney' by significantly increasing gastric juice volume (528 per cent) and gastric acid output (696 per cent). This occurred paradoxically in the presence of a lactate load and a metabolic alkalosis.

AD-A011 455/3GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Pancreatic Endocrine Function in Gram-Negative Shock.
Medical research progress rept.,
Clifford M. Herman, Philip E. Cryer, and Jonas Sode. 1974, 15p
Pub. in the Splanchnic Circulation in Shock, p127-138 1974.

Descriptors: *Septicemia, *Carbohydrate metabolism, *Shock(Pathology), Bacteria, Insulin, Endocrine glands, Pancreas, Primates, Baboons, Models, Laboratory animals, Experimental data.
Identifiers: Gram negative bacteria, Animal models, Pathophysiology.

The authors have carried out a series of studies to evaluate carbohydrate metabolism and insulin dynamics in experimental gram-negative septicemia and to define the underlying mechanisms. In order to avoid the unique splanchnic vascular responses of the dog in shock, the baboon was used as a subhuman primate model.

AD-A011 463/7GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Human T-Cell Heterogeneity as Delineated with a Specific Human Thymus Lymphocyte Antiserum.
Medical research progress rept.,
James N. Woody, Aftab Ahmed, Richard C. Knudsen, Douglas M.Strong, and Kenneth W. Sell. 4 Oct 74, 13p
Availability: Pub. in The Jnl. of Clinical Investigation, v55 n5 p956-966 May 75.

Descriptors: *Lymphocytes, *Thymus, *Heterogeneity, Leukocytes, In vitro analysis, Toxicity, Immunology, Antigens, Reprints.
Identifiers: *T cells, Phytohemagglutinin, Concanavallin A, Pokeweed mitogen, Antiserum.

Human peripheral blood lymphocytes (BPL) were evaluated by their responses to phytohemagglutinin (PHA-P), concanavallin A (con-A), and pokeweed mitogen (PWM), both before and after treatment with an antiserum against human thymic lymphocyte antigens (HTLA) that had been made T-cell-specific by multiple absorptions with immunoglobulin EAC-positive lymphoblast cell lines (B cells). Cells treated with HTLA were examined for their ability to react in a mixed lymphocyte culture (MLC) and to form killer cells in a cell-mediated lymphocytotoxicity (CML) system.* Sensitized cells were also examined for their ability to respond to purified protein derivative (PPD) by blastogenesis, migration inhibitory factor release (MIF), and lymphotoxin (LT) production, both before and after treatment with HTLA and complement. The HTLA was in itself highly stimulatory to PBL. However, with the addition of complement and subsequent cell destruction, a marked decrease in its stimulatory response was noted. PBL treated with HTLA and complement exhibited marked inhibition of responsiveness to con-A with little decrease in PHA-P or PWM stimulation except at very high concentrations of HTLA.

AD-A011 478/5GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Differential Susceptibility of Human IgA Immunoglobulins to Streptococcal IgA Protease.
Medical research progress rept.,
Andrew G. Plaut, Richard Wistar, Jr., and J. Donald Capra. 21 Jun 74, 6p
Availability: Pub. in Jnl. of Clinical Investigation, v54 n6 p1295-1300 Dec 74.

Descriptors: *Immunoglobulins, *Streptococcus, *Enzymes, *Peptide hydrolases, Immunology, Humans, Reprints.
Identifiers: *IGA protease.

IgA protease, a proteolytic enzyme found in human saliva and colonic fluid, hydrolyzes human serum IgA immunoglobulins to yield Fab sub a and Fc sub a fragments. The enzyme is produced by organisms in the normal human microflora and can be purified from culture filtrates of the common human oral organism Streptococcus sanguis (American Type Culture Collection no. 10556). IgA protease is inactive against all other protein substrates examined including the other classes of human immunoglobulins. The role of this enzyme in affecting the function of the secretory IgA immune system is unknown. To further characterize and explain this unusual substrate specificity, the susceptibility of 31 human IgA myeloma proteins of both subclasses was investigated. 16 IgA1 and 15 IgA2 myeloma paraproteins were treated with enzyme and the extent of proteolysis was determined by cellulose actate electrophoresis, immunoelectrophoresis, polyacrylamide gel electrophoresis, and column chromatography. All IgA1 proteins were enzymatically cleaved to Fab sub a and Fc sub a fragments, but all IgA2 proteins were resistant, yielding no fragments after prolonged enzymatic treatment. N-terminal amino acid sequence analysis of the purified Fc sub a fragment of a single IgA1 paraprotein was as follows: Thr-Pro-Ser-Pro- -Thr-Pro-Pro-Thr-Pro-Ser-Pro-Ser. Comparison of this sequence to that reported for the IgA1 heavy chain shows that the enzyme-susceptible peptide bond is a Pro-Thr in the IgA1 hinge region.

AD-A011 479/3GA PC$3.25/MF$2.25
Seoul National Univ (Republic of Korea) Dept of Parasitology
The Periodicity of the Microfilariae of 'Brugia malayi' in Cheju Island, Korea,
Byong-Seol Seo. 1974, 7p ARDG(FE)-486-4
Grant DA-RDRF-S92-544-74-G207
Summary in Korean.
Availability: Pub. in the Korean Jnl. of Parasitology, v12 n2 p95-100 1974.

Descriptors: *Filariae, *Filariasis, *Korea, Epidemiology, Parasitic diseases, Surveys, Periodic variations, Reprints.
Identifiers: *Brugia malayi.

The periodicity of the microfilariae of Brugia malayi was studied in 9 human carriers from Shin-san Ri, Seong-san Myon, Cheju Island. The periodicity pattern was markedly nocturnal and the peaks were observed between 21:30 p.m. and 5:30 a.m. The average peak count was 1:30 a.m. and the percentage of peak count at this time was 95.3. The ratio of minimum of the average peak count percentages to the maximum was 8.3. The periodicity pattern of B. malayi in Cheju Island was compared with that in Inland and no differences were found between two forms. From the above observations, it was concluded that the periodicity of B. malayi in Korea is markedly nocturnal and closely resembles that in the strain of Penang, Malaya. (Author)

AD-A011 533/7GA PC$3.25/MF$2.25
University of Southern California Los Angeles Dept of Physiology
Renal Parameter Estimates in Unrestrained Dogs,
Roland D. Rader, and Christopher M. Stevens. 28 Jan 73, 15p AFOSR-TR-75-0751

Grant AF-AFOSR-2190-72
Availability: Pub. in Medical and Biological Engineering, p465-477 Jul 74.

Descriptors: *Kidneys, *Dogs, *Blood flow, *Mathematical models, Arteries, Vasoconstricting, Reprints.

A mathematical formulation has been developed to describe the haemodynamic parameters of a conceptualised kidney model. The model was developed by considering regional pressure drops and regional storage capacities within the renal vasculature. Estimation of renal artery compliance, pre- and postglomerular resistance and glomerular filtration pressure is feasible by considering mean levels and time derivatives of abdominal aortic pressure and renal artery flow. If the level of flow is not greatly altered during an experimental sequence, it may also be feasible to estimate changes in glomerular filtration rate. Changes in the smooth muscle tone of the renal vessels induced by exogenous angiotensin amide, acetylcholine and by the anaesthetic agent halothane were estimated by use of the model. By employing totally implanted telemetry, the technique was applied on unrestrained dogs to measure renal resistive and compliant parameters while the dogs were being subjected to obedience training, to avoidance reaction and to unrestrained caging. An increase in vasoconstrictor tone in the renal artery and in the afferent arterioles in response to an increasing level of stimualtion was demonstrated using this model. (Author)

AD-A011 534/5GA PC$3.25/MF$2.25
University of Southern California Los Angeles Dept of Physiology
Telemetered Renal Responses to Avoidance and Aggression in Dogs,
Roland D. Rader, Christopher M. Stevens, John P. Meehan, and James P. Henry. 17 Oct 73, 11p AFOSR-TR-75-0750
Grant AF-AFOSR-2190-72
Availability: Pub. in Biotelemetry, v1 p3-11 1974.

Descriptors: *Kidneys, *Dogs, *Excitation, Stress(Physiology), Stress(Psychology), Stimulation(Physiology), Blood flow, Arteries, Telemeter systems, Implantation, Reprints.

Renal hemodynamics were investigated in unrestrained dogs by using a totally implanted telemetry system. A pulsed ultrasonic flow velocity measurement technique has been specially designed to achieve power economy, a stable sensitivity factor, and a stable zero flow baseline. It detects renal artery flow while the abdominal aortic pressure is measured by an implanted button-type transducer. The recorded wave shapes were analyzed in accordance with principles evolved from a hydraulic model of the kidney circulation. This model leads to estimates of the level of constriction in preglomerular and postglomerular renal vessels. In a program to study changes in these renal parameters, dogs were exposed to acute and chronic sympathetic arousal. (Author)

AD-A011 606/1GA PC$4.25/MF$2.25
Advisory Group for Aerospace Research and Development Paris (France)
Treadmill Exercise Testing at the USAF School of Aerospace Medicine: Physiological Response in Aircrewmen and the Detection of Latent Coronary Artery Disease,
V. F. Froelicher, F. Yanowitz, A. J. Thompson, and M. C. Lancaster. May 75, 65p Rept no. AGARD-ograph-210
NATO furnished.

Descriptors: *Cardiovascular diseases, *Exercise(Physiology), *Coronary disease, *Aerospace medicine, Flight crews, Medical examination, Personnel selection, Air Force, Response(Biology), Electrocardiography, Oxygen consumption, Diagnosis(Medicine), NATO.
Identifiers: Evaluation.

Coronary heart disease (CHD) has reached epidemic proportions in all developed countries; it accounts for over 1,000,000 deaths in the United States each year, which is more than all other diseases combined. Over half of these deaths are unexpected in that they occur without preceding symptoms of CHD. Despite the selective nature of the USAF flying population, CHD is the leading disease cause of death, disability and removal from flying duties. It appears that USAF aircrewmen very well fit the national statistics. Because of the critical nature of flying duties and the pertinence of flying safety, the early detection of CHD is essential in the USAF flying population. The AGARDograph presents the experience of the United States Air Force School of Aerospace Medicine (USAFSAM) in the use of treadmill exercises for evaluating asymptomatic aircrewmen; it consists of separate studies involving different aspects of treadmill testing experience at the USAFSAM, including descriptions of techniques used at the USAFSAM.

JPRS-64816 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Neuroleptanalgesia During Surgery Under Local Anesthesia,
A. A. Vishnevskii, T. M. Darbinyan, and A. A. Papin. 21 May 75, 11p
Trans. of Sovetskaya Meditsina (USSR) n4 p3-8 1974.

Descriptors: *Anesthesiology, *Analgesics, Local anesthetics, Surgery, Anesthetics, Translations, USSR, Nervous system, Tranquilizer drugs.
Identifiers: Droperidol, Propionanilide/N-(1-phenethyl-4-piperidyl).

The report contains a study of a new combined method of anesthesiology-neuroleptanalgesis during local anesthesia, that is the combined use of droperidol and phentanyl during surgery under local anesthesia.

NTIS/PS-75/543/9GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Hepatitis and Blood Transfusions (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Pernell W. Crockett. Jul 75, 63p*
Supersedes NTIS/PS-74/115.

Descriptors: *Bibliographies, *Hepatitis, *Blood transfusion, Epidemiology, Hepatitis viruses, Antigens, Blood, Detection, Serology, Attenuation, Removal, Viral diseases, Infectious diseases.

The reports discuss research on serological methods for the detection of hepatitis virus in blood and procedures for the removal or inactivation of the virus from blood or blood components. Studies are also included on the epidemiology of hepatitis. (Contains 58 abstracts).

N75-23150/6GA PC$4.25/MF$2.25
Advisory Group for Aerospace Research and Development, Paris (France).
Spinal Injury after Ejection.
R. Auffret, and R. P. Delahaye. Feb 75, 59p
AGARD-AR-72

Descriptors: *Aircraft pilots, *Ejection injuries, *Human pathology, *Spine, Aerospace medicine, Human factors engineering, Mortality, Spinal cord, Surveys, Vertebrae.

For abstract, see STAR 1314

PB-242 020/6GA PC$5.25/MF$2.25
Illinois Univ. at Urbana-Champaign.
Social Networks and Health Care Consumership: Applications of Models of Health Service Utilization.
Final rept. Sep 70-Dec 74,
Jeffrey C. Salloway. Dec 74, 112p NCHSR-75/101
Grant PHS-HS-00487

Descriptors: *Medical services, Culture(Social sciences), Questionnaires, Utilization, Availability, Models, Human behavior, Surveys, Tables(Data), Consumers, Socioeconomic status.
Identifiers: Health care delivery systems, Community health services, Health care facilities.

The report presents a survey study seeking to find relationships holding between health/sickness behaviors of individuals and families and some other variables which could be measured by the same survey questionnaire. Of primary interest as predictors of utilization behavior were what the investigator called social network variables. Such variables were defined in terms of responses given to questions about relatives and friends. The author developed the one hour survey instrument, recruited indigenous and student interviewers, collected data from 191 households, reviewed the utilization literature, developed a set of hypotheses, analyzed his data and produced this report. An informal study of utilization of health services by Gypsies in Boston was also undertaken. All in all the effort and product are rather impressive but can only be reasonably viewed as an exploratory study with evolving and, even in its final form, somewhat hazy goals.

PB-242 190/7GA PC$7.25/MF$2.25
Yale Univ., New Haven, Conn. School of Medicine.
An Evaluation of Policy Related Research on New and Expanded Roles of Health Workers.
Final rept. Jul 73-Oct 74,
Eva D. Cohen, Linda M. Crootof, Marsha G. Goldfarb, Kathleen Keenan, and Mieko M. Korper. Oct 74, 222p* NSF/RA/S-74-015
Grant NSF-APR73-07904

Descriptors: *Medical personnel, *Medical services, Policies, Recommendations, Benefit cost analysis, Evaluation, Nurses, Manpower, Education, Training programs, Distribution(Property), Attitudes.
Identifiers: *Paramedical personnel, Health car delivery systems.

The study assesses the current state of the art of empirical research on the roles, functions, and impact of intermediate level health care practitioners. It evaluates the validity of the research and the extent to which it addresses policy related questions of the costs and benefits associated with the introduction of new types of health personnel. Factors associated with their efficient use are also examined. A primary finding is that there is a paucity of empirical policy related research on the impact of such personnel, and of the effects of current legal and financial policies on their efficient use. Limitations in the studies center on the nature of the research designs, the absence of random sampling and/or control-comparison groups and the problems of generalizing from the experiences of a relatively small group of practitioners. Recommendations to increase the usefulness of future research on new health practitioners to decision makers are included.

PB-242 243/4GA PC$3.25/MF$2.25
Scripps Clinic and Research Foundation, La Jolla, Calif.

Production of HL-A Xenoantisera.
Rept. for 28 Jun 74-27 Jun 75,
Soldano Ferrone. May 75, 10p
Contract N01-AI-4-2557

Descriptors: *Antibodies, *Immune serums, Surgical transplantation, Immunology, Production, Laboratory animals.
Identifiers: HLA antigens, *HLA antibodies, Histocompatibility antigens, Histocompatibility antibodies.

The report describes an attempt to develop the best experimental conditions for the most effective production of a variety of monospecific HL-A xenoantisera. The authors immunized a variety of animals with purified, soluble HL-A allo-antigens. The objective was to make xenoantisera available in bulk quantities.

PB-242 283/0GA PC$6.25/MF$2.25
Yale Univ., New Haven, Conn. School of Medicine.
An Evaluation of Policy Related Research on New and Expanded Roles of Health Workers. Annotated Bibliography,
Eva D. Cohen, Kathleen Keenan, Linda M. Crootof, Beverly S. Greenberg, and Mieko M. Korper. Oct 74, 168p* NSF/RA/S-74-015A
Grant NSFAPR-73-07902

Descriptors: *Bibliographies, *Medical services, *Medical personnel, Consumers, Nurses, Physicians, Roles(Behavior), Evaluation, Policies, Legislation, Education, Manpower.
Identifiers: Health care delivery systems, *Paramedical personnel.

The annotated bibliography includes a selection of evaluations of research on the quality, quantity, and nature of services provided by new types of health personnel, such as nurse practitioners and physician's assistants. Additional topics covered are the acceptance by providers and consumers, as well as the costs and legal issues associated with the training and use of new health practitioners in the health services system. A separate project report provides a summary of the studies by subject areas.

PB-242 364/8GA PC$5.25/MF$2.25
Veterans Administration Hospital-Wadsworth, Los Angeles, Calif.
Nitrogen Metabolism in Uremia.
Annual rept. 5 Nov 73-5 Oct 74,
Joel D. Kopple, and Marian E. Swendseid. 14 Oct 74, 107p AK-7-3-2210
Contract N01-AM-3-2210
Prepared in cooperation with California Univ., Los Angeles. See also PB-229 902.

Descriptors: *Uremia, *Protein metabolism, *Histidine, *Artificial kidneys, Diets, Anemias, Amino acids, Nutrition, Physiology.
Identifiers: *Hemodialysis.

Evidence is presented that histidine is an essential amino acid in chronically uremic and normal man. In the absence of dietary histidine, decreased plasma and muscle histidine, negative nitrogen balance, reduction in erythropoiesis, and a clinical syndrome occur. However, in uremic and dialysis patients ingesting nutritious diets, supplemental dietary histidine does not improve the anemia or other manifestations of uremia. Evidence suggests that the dietary histidine requirement can be determined from the plasma levels. Alterations in plasma and muscle amino acid concentrations are reported. The ratio in plasma of essential/non-essential amino acids reflects the protein intake in uremic patients, but the valine/glycine ratio is affected by both protein intake and uremia per se.

PB-242 528/8GA PC$5.25/MF$2.25
National Highway Traffic Safety Administration, Washington, D.C. Office of Management Systems.
Emergency Medical Services: A Bibliography with Abstracts.
Special bibliography no. 8, 1967-Apr 74.
May 74, 108p* DOT-HS-801 179
See also PB-232 234.

Descriptors: *Bibliographies, *Medical services, Transportation, Ambulances, First aid, Accidents, Education, Medical personnel.
Identifiers: *Emergency medical services, Health care delivery systems, DOT/5A, DOT/3G.

The documents cited in this publication are in the NHSTA Technical Services Division collection and can be examined there. Since this collection was established in 1967 most of the publications cited bear a publication date of 1967 or later. Citations and abstracts are those that have previously appeared in the NHSTA publication Highway Safety Literature. Portions of this document are not fully legible.

6F. Environmental Biology

AD-A011 130/2GA PC$3.25/MF$2.25
Naval Medical Field Research Lab Camp Lejeune N C
Insect Repellent Jackets: A Protective Item for Use Against Blood-Feeding Diptera.
Interim rept.,
Roger H. Grothaus, James R. Haskins, and Larry L. Bruner. Jun 75, 11p Rept no. NMFRL-Vol-XXV-No-7

Descriptors: *Insect repellents, *Protective clothing, Disease vectors, Insects, Diptera, Jackets, Military personnel, Diseases, Prevention, Consumers, Culicidae, Protection.
Identifiers: Evaluation, Recommendations.

A new insect repellent jacket constructed of polyester and cotton netting has been developed. The Naval Medical Field Research Laboratory began studying the possibility of using cool, wide-mesh netting treated with space repellents in 1965. Insect repellent jackets were developed as a result of the initial research. The current jacket is lightweight and cool. It is designed as a waist-length overjacket with extra length sleeves and a hood with an open face. The production model has front closure snaps in addition to a drawstring on the hood. Good consumer acceptance has been received from test users. The jacket to date has proven effective against mosquitoes, Leptoconops, Culicoides, black flies, and deer flies.

AD-A011 222/7GA PC$3.25/MF$2.25
Army Environmental Hygiene Agency Aberdeen Proving Ground Md
Evaluation of HERCON (Trade Name) Roach Tape Under Use Conditions.
Entomoligical special study, Jun 74-May 75,
Jimmy H. Nelson. May 75, 21p Rept no. USAEHA-44-050-74/75

Descriptors: *Insecticides, *Blattidae, Insect control, Tapes, Dining halls, Military facilities, Efficiency, Effectiveness.
Identifiers: *Cockroaches, Phosphorothioates, Evaluation, *Diazinon.

Adhesive-backed plastic strips (2.5 cm wide by 10.2 cm long) impregnated with Baygon or diazinon and designed for use in conjunction with routine cockroaches control procedures were evaluated for efficacy, duration of effectiveness, and feasibility of use in various sizes and types of dining facilities at US Army installations. Based upon cockroach population levels of spray-only, tape-only, and spray-plus-tape treatments over a period of 12 weeks or less, in only one instance (Ft Bragg, NC) were postreatment cockroach levels lower in the spray-plus-tape treatment than in the spray-only treatment. Assuming that tape placement was optimal at all locations and that pesticide concentrations were at least minimal to effect cockroach mortality, the tapes appeared to add nothing to effective cockroach control under the conditions encountered in these tests. In most cases, however, the cockroach populations were so low that comparisons between treatments were tenuous and building construction at the test cockroach control under the conditions encountered in these tests. Further evaluations of HERCON roach tape for use in dining facilities are not recommended at this time.

AD-A011 558/4GA PC$4.25/MF$2.25
California Univ Irvine
Environmental Quality Research.
Annual rept. no. 1, 1 Feb-15 Jun 74,
Shimshon Lerman, Robert Cooper, Jan Scherfig, and Gerald Greenhouse. Feb 75, 62p AMRL-TR-74-82
Contract F33615-73-C-4059

Descriptors: *Environments, *Contaminants, Indicators, Aquatic animals, Plants(Botany), Hydrogen chloride, Hydrogen fluoride, Fishes, Amines, Tables(Data), Exposure(Physiology), Bioassay, Algae, Air Force, Teratogenic compounds, Fuels, Naphthalenes.
Identifiers: *Environmental quality, *Air pollution effects(Plants), *Water pollution effects(Animals), *Bioindicators, Naphthylamines, Naphthylamine/phenyl, Naphthylamine/octylphenyl, Diphenylamine/dioctyl.

The report for the period from February 1 to June 15, 1974 contains the results of research efforts of 4 projects concerned with defining the environmental effects of potential environmental contamination resulting from the use of certain Air Force materials. The 4 projects use different organisms as means of assessing effects. Project I uses the higher plants, the gymnosperms and angiosperms. Project II uses fish and aufwuchs. Project III utilizes unicellular algae and Project IV uses the eggs, embryo and larvae of the leopard frog. Materials being evaluated include hydrogen chloride, hydrogen fluoride, RJ 4, RJ 5, JP 4, N phenyl-alpha-naphthylamine, p,p' dioctyldiphenylamine, octyl-phenyl-alpha-napthylamine. Techniques for exposing organisms to these substances are discussed and the results of such exposures are presented.

COM-75-10699/7GA PC$3.25
Virginia Inst. of Marine Science, Gloucester Point. Dept. of Environmental Physiology.
The Use of Physiological Indicators of Stress in Marine Invertebrates as a Tool for Marine Pollution Monitoring,
M. P. Lynch. 1974, 11p VIMS-Contrib-625
NOAA-75051202
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant. Pub. in Marine Technology Society Annual Conference Proceedings (10th), p881-890 n.d.

Descriptors: *Indicator species, *Crabs, Stress(Physiology), Glucose, Shellfish, Crustacea, Aquatic animals, Blood proteins, Invertebrates, DDT, Pesticides, Plankton blooms, Physiological effects, Water pollution.
Identifiers: Thermal pollution, Sea Grant program, *Water pollution effects(Animals), Callinectes sapidus, Blue crabs, Bioindicators, Baseline measurements.

In marine environments, because of the possibility of synergistic effects brought about by the ionic composition of the medium, physiological criteria would be a much more sensitive measure of pollution effects than a determination of the pollutant itself. Selected serum constituents

of the blue crab, Callinectes sapidus, subjected to natural stresses (red tide and holding) and pollution related stresses (DDT and thermal shock) were compared to 'baseline' concentrations of the same constituents in crabs from unstressed environments. Glucose in new year class females and serum protein in both males and females were higher in red tide stressed crabs. Protein and total osmotic concentration were lower in DDT stressed crabs. Thermal stress resulted in higher total ninhydrin positive substances, total osmotic concentration and glucose and lower chloride in female crabs. Comparing serum constituents of animals offers promise as a tool for assessing the effects of pollutants on marine animals and for monitoring pollution effects in natural environments.

COM-75-10716/9GA PC$4.75/MF$2.25
North Carolina Agricultural Experiment Station, Raleigh.
Demand for and Cost of Coastal Salt Marsh Mosquito Abatement.
Technical bulletin,
D. V. DeBord, G. A. Carison, and R. C. Axtell.
Mar 75, 94p Technical Bull-232, UNC-SG-75-11 NOAA-75050803
Grant NOAA-04-3-158-40

Descriptors: *Culicidae, *Insect control, Insects, Pest control, Insecticides, Models, Benefit cost analysis, Aedes, Abatement.
Identifiers: Sea Grant program, *Mosquitos, Atlantic Coast(United States).

Data related to mosquito abatement activities for 30 East Coast districts for 1959 through 1971 were analyzed. A trend analysis was conducted on mosquito densities, temporary and permanent abatement work, total abatement expenditures and per capita abatement expenditures. A four-equation pest management model was used to examine the responsiveness of mosquito numbers to permanent and temporary abatement procedures and to analyze the factors affecting the demand for mosquito abatement. A regression model was used to check for possible economies of scale in permanent and temporary abatement work. The analysis revealed that both temporary and permanent abatement procedures significantly reduced the average mosquito population during the 13-year period. The demand for abatement was determined to be affected by income, state grants, tourism, the wage rate (a proxy for price), and population. The implications of these results are discussed in relation to the formation of new abatement districts.

COM-75-50192-02-02/GA
(Order as COM-75-50192-02)
Scripps Institute of Oceanography, La Jolla, Calif.
Experimental Studies of Algal Canopy Interactions in a Sea Otter-Dominated Kelp Community at Amchitka Island, Alaska,
Paul K. Dayton. Jun 74, 9p NOAA-75051501-2
Grants NSF-GA-30877, NSF-GV-32511
Sponsored in part by Grant NSF-GH-112.
Included in Fishery Bull., v73 n2 p230-237 Apr 75.

Descriptors: *Algae, *Phaeophyta, *Ecology, Aquatic animals, Aquatic plants, Interactions, Amchitka Island, Alaska.
Identifiers: Sea Grant program, *Sea otters, Predators.

Studies on the results of competitive interactions between three kelp canopy guilds were conducted in a community in which herbivorous invertebrates have been largely removed from shallow water (approximately 20 m) by sea otters. Small sea urchins observed in the haptera of kelps all disappeared following the canopy removal, suggesting that the canopy itself offers a modest refuge from their predators. Experiments prove that the largest alga, Alaria fistulosa, behaves as a fugitive species with respect to Laminaria and Agarum species in spite of the structural dominance of a floating canopy. Vegetative regeneration may give Laminaria longipes an advantage over other Laminaria species, Alaria, and presumably Agarum cribosum following disturbances in very shallow water (< 5 m). Laminaria species suppress Agarum growth (and recruitment) in moderate depths (5-20 m) where either Laminaria or Agarum suppresses growth of red algal turf beneath them, and where both Laminaria and Agarum must be removed to allow recruitment and growth of Alaria fistulosa.

COM-75-50192-02-13/GA
(Order as COM-75-50192-02)
San Diego State Univ., Calif. Center for Marine Studies.
Ecological Studies of the Puerulus Larval Stage of the California Spiny Lobster, 'Panulirus interruptus',
Steven A. Serfling, and Richard F. Ford. Jun 74, 19p Contrib-3 NOAA-75051501-13
Grants NSF-GH-36, NOAA-2-35208
Included in Fishery Bull., v73 n2 p360-377 Apr 75.

Descriptors: *Lobsters, *Ecology, Larvae, Life cycles, Shellfish, Aquatic animals, Marine biology, Aquaculture, Estuaries, Coasts.
Identifiers: Panulirus interruptus, Sea Grant program.

Ecological and related behavioral studies of the puerulus larval stage of the California spiny lobster, Panulirus interruptus, involved the development and use of artifical and natural seaweed habitat traps, special paired neuston nets, and underwater night-lights for collecting and observing pueruli in nature. The results obtained indicate that pueruli first enter the coastal waters off San Diego, California, during May, and continue to appear regularly through September, but with no apparent relationship to lunar or temperature cycles. Pueruli exhibit a strong attraction to floating habitat traps containing the surfgrass Phyllospadix torreyi and to bright lights at night. The results also suggest that the puerulus is a surface-swimming, pelagic form which may actively seek out specific nearshore areas for settlement, and thereby serve the important function of returning larval stages to areas suitable for demersal life of the young juveniles.

COM-75-50192-02-14/GA
(Order as COM-75-50192-02)
Scripps Institution of Oceanography, La Jolla, Calif.
A Theoretical Treatment of Unstructured Food Webs,
G. D. Lange, and A. C. Hurley. Jun 74, 5p NOAA-75051501-14
Included in Fishery Bull., v73 n2 p378-381 Apr 75.

Descriptors: *Food chains, Matrices(Mathematics), Mathematical models, Marine biology, Biomass.

In a recent paper, Isaacs proposed a model for an unstructured food web in which the interconnections are so diverse that all heterotrophs in the system can be treated as if they were at the same average trophic position. This paper recasts the original model in terms of a 3 x 3 matrix using three empirical constants. In this form, the model can easily be generalized to one having nine constants and reflecting a more realistic view of the interactions among levels of a community.

N75-22937/7GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
Water Hyacinths and Alligator Weeds for Removal of Lead and Mercury from Polluted Waters.
B. C. Wolverton, and R. C. Mcdonald. 11 Apr 75, 14p NASA-TM-X-72723

Descriptors: *Lead (Metal), *Mercury (Metal), *Pollution control, *Vegetation growth, *Water pollution, Absorptivity, Machining, Tables (Data), Toxicity.

For abstract, see STAR 1314

PB-242 180/8GA PC$5.25/MF$2.25
New York Univ. Medical Center, N.Y. Inst. of Environmental Medicine.
Cadmium in an Aquatic Ecosystem: Distribution and Effects.
Annual progress rept. no. 1,
Theodore J. Kneip, and Henry I. Hirshfield.
1975, 122p NSF/RA/E-74-044

Descriptors: *Cadmium, *Nickel, *Toxicology, Water pollution, Ecology, Evaluation, Distribution(Property), Aquatic biology, Metals, Industrial wastes, Swamps, Hudson River, Contamination, Tables(Data), Mussels.
Identifiers: *Water pollution effects(Animals), *Water pollution effects(Plants), *Ecosystems.

The report is concerned with evaluating the distribution and effects of cadmium and nickel released into an aquatic ecosystem by local industry. The study focused upon the Foundry Cove Area which includes both a tidal marsh and an associated cove on the east side of the Hudson River just north of Constitution Island. The study provides data regarding the processes resulting in the spread of contamination and preliminary systematic information on uptake by biota and possible effects on certain organisms in the ecosystem.

TT-74-54033 PC$3.25
Department of Agriculture, Washington, D.C.
Examination of the Stability in Insecticidal Action of Certain Oil Wood Preservatives (Badanie Trwalosci Owadobojczego Dzialania Niektorych Srodkow Impregnacyjnych do Drewna),
Jan Dominik. 1975, 8p
Trans. of Folia Forestalia Polonica. Seria B. Drzewnictwo, n8 p45-51 1968 by Zdzislaw Markiewicz. Sponsored in part by the National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Insecticides, *Wood preservatives, Stability, Poland, Translations.

Eight oil preservatives manufactured in Poland were subjected to examination. In 1961 the immediate effectiveness in wood protection against insects was determined on the basis of laboratory experiments. At the same time border insecticidal values were established for these preparations. After the completion of experiments wood blocks on which examinations were carried out, were carefully set and bound and during 5 years stored in a ventilated attic. In 1966 these samples were again infected with larvae in order to find the effectiveness of the protective action of the examined preparations and for the repeated determination of the border insecticidal value. Their toxicity, toward Hylotrupes bajulus larvae decreased.

6G. Escape, Rescue, and Survival

AD-A011 211/0GA PC$7.50/MF$2.25
Operations Research Inc Silver Spring Md
A Study of Factors Influencing the Wearability of PFDs in Recreational and Work Environments.
Final rept.,
Oct 74, 227p Rept no. ORI-TR-907 USCG-D-88-75

Contract DOT-CG-31446-A

Descriptors: *Life jackets, *Floats, *Standards, Compatibility, Reliability, Safety, Life saving, Specifications, Buoyancy, Fabrics, Sea rescues, Boats, Accidents, Attitudes(Psychology), Computer aided design.
Identifiers: *PFD(Personal Flotation Devices), *Personal flotation devices, Dot/5A, *Recreational boating, Design standards.

This report describes the investigation and results of a pilot study of Personal Flotation Device (PFD) wearability. The study (1) estimated the relative impact of various PFD design parameters on PFD wearability and used this information for predicting what increase in wearability could be achieved; (2) generated an approach for the development of an index of wearability which the Coast Guard could use to evaluate PFD designs (3) determined the differential preferences of Coast Guard tender work crews for alternative PFD designs. Both recreational boaters and USCG tender crews have been surveyed to obtain information on the ranking of various PFD characteristics. The data is so displayed that the most important characteristics can be identified. An analytical model is developed to determine the probability of a candidate PFD design being worn based on the survey information. Psychological aspects of PFD wearability are developed to help define personal attitudes of the boating public toward PFD wearing.

AD-A011 420/7GA PC$3.75/MF$2.25
Navy Clothing and Textile Research Unit Natick Mass
Visor System Materials for Aluminized Firemen's Hoods. Report No. 1: Problem Identification.
Technical rept.,
Norman F. Audet. May 75, 26p Rept nos. TR-111, 4-74

Descriptors: *Protective mask facepieces, *Fire protective clothing, *Helmets, Gold, Storage, Abrasion, Radiant heating, Protection, Naval personnel, Metal coatings.

The study determined the durability of the gold-coated facepiece component of the crash-crew firefighters' visor system, because field observations indicated that the gold coating wore off readily. The study examined methods employed by fire station personnel in caring for the facepiece and in replacing it; and the effect of various contaminants and abrasive materials on the quality of the gold coating and its subsequent heat resistance.

6H. Food

COM-75-10700/3GA PC$3.25/MF$2.25
New York State Agricultural Experiment Station, Geneva. Dept. of Food Science and Technology.
Nature's Immobilized Enzyme,
R. S. Shallenberger, Sarah M. Herbert, and Betty A. Lewis. 1975, 3p NOAA-75051210
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant. Prepared in cooperation with New York State Coll. of Human Ecology, Ithaca. Dept. of Design and Environmental Analysis, and New York Sea Grant Inst., Albany. Pub. in New York's Food and Life Sciences.

Descriptors: *Clams, *Enzymes, Wastes, Shellfish, Invertebrates, Stomach, Mollusca, Digestive system, Carbohydrates, New York, Starches, Sugars, Food processing.
Identifiers: Sea Grant program, Surf clams, *Spisula solidissima, *Crystalline style.

The shellfish processing industry of New York harvests about 3 1/2 million pounds of surf clam (Spisula solidissima) annually. The clams are shucked and eviscerated before being processed and marketed, yielding an appreciable amount of waste in the form of stomach and intestine, which constitute from 7 to 20 percent of the total meat. The objective of this study was to determine ways to use this waste. Attention was given to the crystalline style of the clam, which is a cylindrical structure located in the stomach that helps to grind food material. Carbohydrases are secreted that lyse the cellulose walls of the food and initiate hydrolysis of the carbohydrate reserves--laminaran and starch--to sugars. A powder was prepared from the crystalline style; in this form, enzyme activities seem to be stable indefinitely, and it is this material that may have many scientific, technological, and industrial uses.

PAT-APPL-484 198/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Automatic Produce-Bagging Machine That Uses Factory-Roll Polyethylene Net Tubing.
Patent Application,
Earl K. Bowman, and John C. Teele. Filed 28 Jun 74, 15p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Positioning devices(Machinery), *Packaging, *Citrus fruits, *Patent applications, Bags, Polyethylene, Nets, Automatic.

The patent application describes a produce-bagging machine utilizing factory-roll polyethylene net tubing for automatic packaging. The bagging machine is designed to form bags from factory rolls of polyethylene net tubing, fill the bags with produce, and close and eject them in a continuous automatic cycle. The device is used for packaging of oranges and grapefruits.

PAT-APPL-484 199/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Spreader Mandral for Automatic Produce-Bagging Machine That Uses Factory-Roll Polyethylene Net Tubing.
Patent Application,
Earl K. Bowman, and John C. Teele. Filed 28 Jun 74, 11p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Positioning devices(Machinery), *Packaging, *Citrus fruits, *Patent applications, Bags, Polyethylene, Nets.

The patent application concerns, the design and development of an automatic produce bagging machine which would use factory-roll polyethylene net tubing for the bagging material. It is necessary to design and incorporate into the automatic machine a device which would be capable of spreading the polyethylene net tubing in order to fabricate a net bag. This spreading device is herein described. The device is used for orange and grapefruit packaging.

PATENT-3 830 436 Not available NTIS
Department of Agriculture, Washington, D.C.
Hammer Mill with Integral Subsampling Portion.
Patent,
James W. Dickens. Filed 9 Aug 73, patented 20 Aug 74, 4p PAT-APPL-386 922,
Supersedes PB-230 118.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Mills, *Comminution, *Food processing, Blending, Peanuts, Corn, Grains, Samplers.
Identifiers: PAT-CL-241-73.

The invention relates to a mill for comminuting agricultural products such as peanuts, corn, soybeans, cottonseed and the like. The mill is characterized by the incorporation of an integral subsampling device whereby a comminuted, blended subsample is delivered concomitant the comminution operation.

PB-242 405/9GA PC$3.75/MF$2.25
Massachusetts Inst. of Tech., Cambridge.
Proceedings of the M.I.T. Symposium on Strategies for A.I.D. Programs in Selected Areas of Science and Technology. Volume 4. Food Technology,
J. P. Ruina. Apr 74, 31p
Contract AID/ta-1067
Report on Technology Adaptation Program. See also Volume 3, PB-242 404.

Descriptors: *Technology utilization, *Food industry, *Meetings, Developing countries, Nutrition, Technology transfer, Fermentation, Feeding stuffs, Econometrics, Proteins, Nutritional deficiency diseases.
Identifiers: Single cell proteins, Malnutrition.

The subject matter involves the processing, preservation and manufacture of foods. In the context of technology transfer from industrialized countries to low-income countries one might formulate two basic objectives: The first is to increase food supply, or more accurately, the supply of certain nutrients to populations. A second objective is the combatting of malnutrition.

TT-75-54003 PC$3.25
Agricultural Research Service, Washington, D.C.
Microbiological Method of the Determination of Vitamin B2 in Mushrooms (Proby Okreslania Witaminy B2 w Grzybach za Pomoca Metody Mikrobiologicznej),
H. Mlodecki, E. Wieckowska, T. Janowska, and I. Kawalska. 1975, 13p
Trans. of Bromatologia i Chemia Toksykologiczna (Poland) v6 n1 p23-28 1973. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Vitamin B complex, *Mushrooms, *Microbiology, Fungi, Plants(Botany), Food, Riboflavin, Translations, Lactobacillus, USSR.
Identifiers: Lactobacillus casei, Agaricus bisporus.

A microbiological method with Lactobacillus casei ATCC 7469 as test strain was used for the determination of vitamin B2 in fresh and dried Agaricus bisporus Lange and five other species of mushrooms. The results, depending on the species, average from 0.4 to 4.0 mg% of vitamin B2 when calculated for dry mass of the mushrooms.

6J. Industrial (Occupational) Medicine

NTIS/PS-75/564/5GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Mine Safety. Part 3. Occupational Health--General Studies (A Bibliography with Abstracts).
Rept. for 1964-Jul 75,
Pernell W. Crockett. Jul 75, 115p*
See also Part 2, NTIS/PS-75/563, and Part 4, NTIS/PS-75/565.

Descriptors: *Bibliographies, *Industrial hygiene, *Mining, *Occupational diseases, *Coal mines, Industrial medicine, Noise reduction, Dust control, Mine ventilation, Injuries, Life support systems, Protection, Safety engineering.

Identifiers: Noise pollution, Indoor air pollution.

Research reports cited include data on industrial hygiene and occupational hazards in the mining environment. Topics covered are: Control of noise and respirable dust; mining ventilation; protective equipment and life support systems; and occupational diseases and injuries associated with mining. (Contains 110 abstracts).

NTIS/PS-75/565/2GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Mine Safety. Part 4. Occupational Health--Radioactivity (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Pernell W. Crockett. Jul 75, 54p*
See also Part 3, NTIS/PS-75/564, and Part 5, NTIS/PS-75/566.

Descriptors: *Bibliographies, *Radiation hazards, *Industrial hygiene, *Mining, *Occupational diseases, Pulmonary neoplasms, Radioactivity, Control, Protection, Mine ventilation, Uranium, Radon isotopes.
Identifiers: *Uranium mines.

Data is presented on radiation hazards in the mining environment. Topics discussed are: Radiation monitoring, control and protection; mine ventilation; and occupational diseases with special references to lung cancer. Emphasis is given to uranium mining and occupational hazards from radon and decay products. (Contains 49 abstracts).

PB-242 532/0GA PC$3.25/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Office of Nuclear Reactor Regulation.
Occupational Radiation Exposure at Light Water Cooled Power Reactors 1969-1974.
Jun 75, 21p NUREG-75/032
Supersedes WASH-1311.

Descriptors: *Nuclear reactors, *Irradiation, *Industrial medicine, *Water cooled reactors, Radiation dosage, Radiation hazards, Exposure, Personnel, Statistical data.

The report presents an updated compilation of occupational radiation exposures at commercial light-water-cooled power reactors (LWR'S) for the years 1969 through 1974. The information is derived from reports submitted to the United States Nuclear Regulatory Commission in accordance with requirements of individual plant Technical Specifications and 10m CFR Part 20.407. The average man-rem per unit for all LWR's in 1974 is less than the 1973 value. The grand average since 1969, however, continues to increase. No significant trend was indicated over the period of 1969-1974 in the mean value of man-rem per megawatt-year.

6K. Life Support

AD-A011 680/6GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Human Engineering Considerations in the Evaluation of Diving Equipment.
Medical research progress rept.,
A. J. Bachrach, and G. H. Egstrom. 1974, 19p
Pub. in The Working Diver, pp203-218 1974.

Descriptors: *Diver equipment, *Human factors engineering, Underwater clothing, Safety, Breathing apparatus, Deep diving, Performance, Stress(Physiology), Biomechanics, Motion, Mobility, Respiration, Decompression, Naval research.
Identifiers: Hard hat divers, Diving suits.

Highlights are presented of a particular human factors approach to one aspect of diver performance - the assessment of diving equipment, its impact on the diver's work, and to a degree, his physiological state. Briefly reported are a range-of-motion biomechanical analysis of the flexibility of the two systems and a heart rate-work correlation comparison of the two systems.

6L. Medical and Hospital Equipment

AD-A011 579/0GA PC$3.25/MF$2.25
New England Medical Center Hospital Boston Mass
The Development of a Biological Test System for Calibrating and Evaluating the Performance of Computer-Controlled Optical Scanners.
Annual rept. no. 1, 1972-73,
Ronald S. Weinstein, Michael G. Cedars, and Jonathan S. Wallach. Mar 75, 15p AMRL-TR-74-131
Contract F33615-73-C-4052

Descriptors: *Optical scanning, *Erythrocytes, *Electron microscopy, Cytology, Test methods, Computers, Automation, Cells(Biology), Pathology, Humans, Surfaces, Quantitative analysis.
Identifiers: Evaluation, Stereo images.

A method was developed for processing human red blood cells (RBCs) for microstereology analysis of major cell dimensions. Using this preparative method, RBCs from five normal human donors were prepared for thin section electron microscopy. A test film containing 250 electron micrographs of human RBCs was prepared and analyzed by microstereology methods. Using these methods, the calculated RBC mean corpuscular volume (MCV) is 79.6 cubic micrometers and the mean RBC surface area is 130.1 square micrometers. These results are consistent with results obtained by other quantitative microscopy techniques. The film is of high quality and preliminary testing indicates that the film is suitable for use in evaluations of computer soft ware that is designed to control computer-controlled optical scanners that are utilized for boundary tracing in biological materials.

AD-A011 608/7GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Inflight Patient Monitoring/Blood Pressure Measurement Device.
Final rept. Jun 70-Jul 74,
Helen D. Kopczynski, David L. Stoner, and George A. Rex. May 75, 13p Rept no. SAM-TR-75-9

Descriptors: *Medical equipment, Blood pressure, Aerospace medicine, Patients, Airlift operations, Blood flow, Monitors, Noise, Vibration, Ultrasonics, Inflight, Doppler systems, Accuracy.
Identifiers: *Blood pressure manometers.

The blood pressure measurement device was designed to meet an urgent operational requirement for a method of monitoring vital signs of acutely ill patients while in flight. The high noise and vibration levels of most aircraft make the indirect measurement of blood pressure extremely difficult using the conventional approach. The Military Airlift Command (MAC) requested development of a device which would overcome these constraints. A method using an ultrasonic monitoring device, that employs the Doppler shift principle to detect blood flow and arterial wall motion, was developed by USAFSAM. The inflight blood pressure measurement device consists of a commercial ultrasonic Doppler shift monitor and a standard sphygmomanometer which has been modified by placing a transducer mount through the cuff and bladder. The device is employed similarly to an acoustic stethoscope and sphygmomanometer.

N75-23144/9GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Aerobiocontamination Emitted by a Person Placed in a Laminar Flux Chamber.
J. D. Joubert, J. Citterio, B. Dewimille, and E. Lefort. May 75, 12p NASA-TT-F-16284
Contract NASW-2483
Tran-Transl. Into English from Lyon Chirurgical (France), V. 70, No. 5, 1974 p 349-351.

Descriptors: *Air flow, *Clean rooms, *Decontamination, *Medical equipment, Air purification, Antiseptics, Clinical medicine, Laminar flow, Surgery.

For abstract, see STAR 1314

PB-242 776/3GA PC$3.25/MF$2.25
Gulf South Research Inst., New Orleans, La.
Membrane and Materials Evaluation: North Star Ultra-Thin Cellulose Membrane - Laboratory Evaluation of Ultrafiltration and Solute Permeability Properties.
Annual rept. Jul 73-Jun 74,
Elias Klein, James K. Smith, and F. F. Holland, Jr. 11 Sep 74, 18p AK-2-72-2221-C
Contract PH-72-2221

Descriptors: *Artificial kidneys, *Membranes, Cellulose, Dialyzers, Filtration, Transport properties, Blood, Clearances, Evaluation, Solutes, Permeability, Resistance, In vitro analysis.
Identifiers: Hemodialysis.

The North Star Ultra-thin Cellulose membrane has been characterized as to the following properties: ultrafiltration rate and solute permeability from molecular weight 60 to 60,000 in laboratory test cells. Also, ultrafiltration rates and in vitro clearance for a selected number of solutes in a standard Kiil Dialyzer were determined.

6M. Microbiology:

AD-A011 292/0GA PC$3.25/MF$2.25
Georgetown Univ Washington D C Dept of Biology
Histochemistry of Renal Lesions Induced by Pulsatile Hypothermic Perfusion.
Medical research progress rept.,
George I. Malinin, Jeffrey L. Benjamin, and Kenneth W. Sell. 30 Jul 74, 15p
Contract N00014-69-A-0220
Presented at the Annual Meeting of the Society for Cryobiology (10th).
Availability: Pub. in Laboratory Investigation, v31 n5 p543-554 1974.

Descriptors: *Lesions, *Kidneys, *Histology, Biochemistry, Perfusion, Hypothermia, Nucleic acids, Proteins, Polysaccharides, Reprints.
Identifiers: Histochemistry, Pulsatile hypothermic perfusion, Proteinuria.

Two groups of 10 and 11 canine kidneys were perfused with pulsatile flow at 25 and 5 C., respectively. Marked microscopic quantitative and qualitative differences between the two groups of perfused kidneys were noted, particularly with respect to the glomerular lesions. In the 5 C. perfusion group, 79.1% of the counted glomeruli were structurally intact, whereas only 43.2% were intact following 25 C. perfusion. The glomeruli of kidneys perfused at 25 C. were frequently infarcted (30.0%). The acellular material deposited in infarcted glomeruli contained protein, acid and neutral polysaccharides, and RNA, but no amyloid. Tubular cells of both series contained very little RNA and almost invariably exhibited a strong false positive Feulgen reaction. Hydropic vacuolation was noted in the proximal and distal tubules of both series. Cytoplasmic inclusions usually associated with proteinuria prevailed only in the 25 C. perfusion group. Intravascular depositions of the kidneys perfused

at 25 C. frequently contained RNA. It is concluded that hypothermic pulsatile perfusion, apart from inducing purely morphologic alterations, also induces pronounced temperature-dependent changes in distribution and reactivity of histochemically demonstrable renal nucleic acids, carbohydrates, and protein.

6N. Personnel Selection and Maintenance (Medical)

N75-23084/7GA PC$4.75/MF$2.25
Advisory Group for Aerospace Research and Development, Paris (France).
Medical Requirements and Examination Procedures in Relation to the Tasks of Today'S Aircrew: Evaluation of the Special Senses for Flying Duties.
G. Perdriel. Feb 75, 94p AGARD-CP-152
Conf-Presented at Aerospace Med. Panel Meeting, Naples, 16-20 Sep. 1974.
In English; Partly in French.

Descriptors: *Aerospace medicine, *Flight crews, *Flight fitness, *Physical examinations, *Pilot selection, *Sensory perception, Audiometry, Military aviation, Personnel selection, Speech recognition, Vestibular tests, Visual acuity.

For abstract, see STAR 1314

6O. Pharmacology

AD-A011 142/7GA Not available NTIS
California Univ Los Angeles
Temperature Regulation and Drug Action, (Proceedings of a Symposium on Temperature Regulation and Drug Action, Held in Paris, on April 16-18, 1974).
Final rept.,
P. Lomax, E. Schoenbaum, and J. Jacob. 1975, 425p Rept no. ISBN-3-8055-1756-4
Contract N00014-74-C-0053
Availability: Paper copy available from S. Karger, New York, $54.50.

Descriptors: *Fevers, *Body temperature, *Drugs, *Meetings, Histamine, Amines, Adipose tissue, Physicochemical properties, Physiology, France.
Identifiers: Prostaglandin, Brown adipose tissue, *Thermoregulation, Dopamine, Norepinephrine, Epinephrine.

Contents:
General aspects of thermoregulation;
Mechanisms of fever;
Monoamines and thermoregulation;
Thermogenesis and brown adipose tissue;
Adaptive aspects of thermoregulation;
Pyrexia and prostaglandins;
Drugs and thermoregulation;
Physico-chemical aspects of thermoregulation.

6P. Physiology

AD-A011 317/5GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Biomechanics of Ligament Failure II. An Analysis of Immobilization, Exercise, and Reconditioning Effects in Primates,
Frank R. Noyes, Peter J. Torvik, Walter B. Hyde, and James L. DeLucas. 1974, 15p Rept no. AMRL-TR-74-40
Availability: Pub. in The Jnl. of Bone and Joint Surgery, v56-A n7 p1418 Oct 74.

Descriptors: *Ligaments, *Biomechanics, Bones, Exercise(Physiology), Histology, Recovery, Primates, Reprints.
Identifiers: Immobilization.

The effects of altered levels of activity on the biomechanical properties of a ligament were investigated. After eight weeks of immobilization, anterior cruciate bone-ligament-bone preparations of wild primates tested in tension showed significant decreases in maximum failure load and energy absorbed to failure (39 percent and 32 per cent), and an increase in ligament extensibility (compliance). These changes indicated an altered functional capacity of the ligment unit. The long-term effects of disuse were shown in a second group. After twenty weeks of resumed activity following immobilization, there was only partial recovery in ligament strength, although ligament compliance had nearly returned to normal. In a third group, a voluntary isotonic exercise of one lower limb performed by the primate during immobilization did not prevent disuse-induced changes in ligament failure properties. Ligament properties after immobilization were influenced by: (1) changes in the ligament force-elongation relationship; (2) histological changes at the bone-ligament junction; (3) altered mechanisms of specimen failure; and (4) presumed changes in the glycosaminoglycan and collagen fiber relationship. (Author)

AD-A011 457/9GA PC$3.25/MF$2.25
Eastern Virginia Medical School Norfolk Dept of Physiology and Bioengineering
Modulation of Evoked Responses During Behavioral Motor Inhibition in the Cat.
Annual summary rept. no. 1, 1 Mar 74-28 Feb 75,
Richard C. Howe. 21 Mar 75, 8p
Grant DAMD17-74-G-9390

Descriptors: *Brain, *Motor reactions, Central nervous system, Inhibition, Behavior, Sleep, Physiology, Cats, Experimental data.
Identifiers: Neurophysiology, Evoked responses.

The purpose of this study was to ascertain those brain systems directly associated with inhibition of motor activity. Chronic cats with implanted electrodes were operantly conditioned for an absence of phasic motor activity. Peripherally and centrally evoked responses are obtained from the implanted electrodes during movement, non-movement, and sleep periods. All electrode sites are verified using histological techniques. Standard computer signal averaging techniques are used in the data analysis. Amplitude changes of evoked responses from various brain structures will be compared between movement, non-movement, and sleep stakes. As the data collection phase is still in progress, no results are presently available. Interpretation of the results will be made according to the structural and functional organization of those brain areas showing significant alterations during the behavioral conditions of this study.

JPRS-64798 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Role of Association in the Formation of Evoked Potentials in Human Cerebral Cortex,
E. A. Kostandov, and Yu. L. Arzumanov. 19 May 75, 14p
Trans. of Zhurnal Vysshei Nervnoi Deyatelnosti (USSR) v23 n3 p523-531 1973.

Descriptors: *Cerebral cortex, *Brain, *Electroencephalography, Central nervous system, Electrophysiology, Psychophysiology, Stimulus(Psychophysiology), Responses, USSR, Translations.
Identifiers: *Evoked potentials, Neurophysiology.

In laboratory research one studies the effect of individual isolated stimuli. However, a large number of simultaneous and successive complexes of external stimuli act continually, forming temporary associations among each other in the brain. Walter described what is apparently one of the electrographical indices in man describing development of such association in the form of a slow negative oscillation arising in the frontal areas of the cortex in the interval between two successive stimuli -- a warning and a triggering stimulus. The authors were interested in studying features of cortical evoked electrical activity in response to stimuli of the same modality presented successively as a pair with a definite interval between them. The dependence of evoked electrical activity on the emotional significance of the stimulus when it was presented paired with another stimulus was also studied.

JPRS-64892 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Microelectrode Study of the Human Brain,
M. N. Livanov, and S. N. Raeva. 2 Jun 75, 6p
Trans. of Akademiya Nauk SSSR. Doklady, v204 n2 p507-509 1972.

Descriptors: *Brain, *Nerve cells, *Electroencephalography, USSR, Translations.
Identifiers: Neurophysiology.

The report contains results of investigations of separate neurons of the human brain obtained using a modification of the microelectrode method.

N75-23079/7GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Alimentary Origin of Nycothemeral Variations in the Electrical Activity of the Small Intestine in the Rat.
M. Ruckebusch, and J. P. Ferre. May 75, 9p
NASA-TT-F-16282
Contract NASW-2483
Tran-Transl. Into English from Comp. Rend. Soc. Biol. (Masson), V. 167, No. 12, 1973 p 2005-2009.

Descriptors: *Bioelectricity, *Electromyography, *Intestines, *Rats, Biological effects, Eating.

For abstract, see STAR 1314

N75-23135/7GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Periods of Maximum Peformance and Circadian Rhythm of Physiological Functions.
V. A. Doskin, and N. A. Lavrentyeva. May 75, 11p
NASA-TT-F-16310
Contract NASW-2483
Tran-Transl. Into English from Sov. Med. (Ussr), V. 8, Aug. 1974 p 140-145.

Descriptors: *Circadian rhythms, *Human performance, *Physiological factors, Activity cycles (Biology), Clinical medicine, Students.

For abstract, see STAR 1314

N75-23136/5GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Circadian Fluctuations in the Number of Thrombocytes in Patients with Acute Myocardial Infarction.
R. M. Zaslavskaya, and Y. G. Perepelkin. May 75, 5p NASA-TT-F-16309
Contract NASW-2483
Tran-Transl. Into English from Ter. Arkh. (Ussr), V. 46, No. 6, 1974 p 94-96.

Descriptors: *Circadian rhythms, *Clinical medicine, *Myocardial infarction, *Thrombocytes, Hemodynamic responses, Physiological responses.

For abstract, see STAR 1314

N75-23137/3GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Circadian Rhythm of Physiological Functions in Clinostatic Hypokinesia.
V. M. Koroleva-munts. May 75, 10p NASA-TT-F-16308
Contract NASW-2483
Tran-Transl. Into English from Fiziol. Zh. Sssr (Ussr), V. 60, No. 8, 1974 p 1145-1149.

Descriptors: *Circadian rhythms, *Human body, *Hypokinesia, *Physiological responses, Bed rest, Body temperature, Heart minute volume, Heart rate, Respiratory rate.

For abstract, see STAR 1314

N75-23138/1GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Some Peculiarities of Intracardiac and Intracerebral Hemocirculation in Patients Suffering from Rheumatoid Arthritis.
I. Y. Oranskiy, and L. A. Kozlova. May 75, 11p NASA-TT-F-16307
Contract NASW-2481
Tran-Transl. Into English from Vop. Revmatizma (Ussr), No. 3, Jul. - Sep. 1974 p 47-52.

Descriptors: *Arthritis, *Brain circulation, *Coronary circulation, Blood circulation, Bones, Calcification, Cardiovascular system, Human pathology.

For abstract, see STAR 1314

N75-23140/7GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
On Rod and Cone Visual Acuity.
F. Koester. Apr 75, 7p NASA-TT-F-16303
Contract NASW-2483
Tran-Transl. Into English from Centrablatt Fur Physiol., V. 10, No. 15, 17 Oct. 1896 p 433-436.

Descriptors: *Human performance, *Visual acuity, Brightness, Contrast, Darkness, Visual perception.

For abstract, see STAR 1314

N75-23141/5GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Studies and investigations. Daily Variations of Urinary Excretion of 5-Hydroxy-Indole-Acetic Acid in Normal Subjects.
R. Fogari, C. Goi, and L. Corradi. Apr 75, 7p NASA-TT-F-16302
Contract NASW-2481
Tran-Transl. Into English from Arch. Sci. Med. (Italy), V. 131, No. 2, Apr. - Jun. 1974 p 57-59.

Descriptors: *Excretion, *Human beings, *Urine, Acetic acid, Circadian rhythms, Males.

For abstract, see STAR 1314

N75-23142/3GA PC$3.75/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Brightness Sensation in Indirect Vision.
A. Kirschmann. May 75, 44p NASA-TT-F-16286
Contract NASW-2481
Tran-Transl. Into English from Phil. Stud., V. 5, 1888-1889 p 447-497.

Descriptors: *Brightness, *Peripheral vision, *Retina, *Sensitivity, Eye (Anatomy), Psychophysiology, Sensory perception, Visual discrimination.

For abstract, see STAR 1314

N75-23148/0GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Diurnal Variations of the Physiological Mobility of Human Teeth.
H. Schnell, and J. Greif. Apr 75, 7p NASA-TT-F-16277
Contract NASW-2483
Tran-Transl. Into English from Deut. Zahnaertztl. Z. (East Germany), V. 29, No. 9, Sep. 1974 p 879-880.

Descriptors: *Diurnal variations, *Human body, *Teeth, Mobility, Strain gages.

For abstract, see STAR 1314

6R. Radiobiology

AD-A011 536/0GA PC$3.75/MF$2.25
Northern Illinois Univ de Kalb Dept of Biological Sciences
Orientation Behavior of Ring-Billed Gull Chicks 'Larus delawarensis' Exposed to Project Sanguine's Electric and Magnetic Fields.
Final rept.,
William E. Southern. 15 Sep 73, 40p
Contract N00014-72-A-0050-0002

Descriptors: *Global communication systems, *Birds, *Radiation effects, *Electromagnetic fields, Magnetic fields, Electric fields, Extremely low frequency, Response(Biology), Behavior, Orientation(Direction), Experimental data, Exposure(Physiology).
Identifiers: Sangunine project, *Sea gulls, Larus delawarensis.

The orientation responses of Ring-billed Gull (Larus delawarensis) chicks were tested in 2,187 orientation cage trials at the Sanguine Wisconsin Transmitter Facility during the summer of 1973. The 255 controls tested with both antennas turned off exhibited statistically significant (.05) mean headings. Results from 1,133 experimental trials conducted on the ground above the energized buried antenna suggest that the Sanguine electromagnetic field disrupts the ability of young gulls to select their preferred heading. Some inconsistencies exist in the data which cannot be explained at this time. Increasing the distance between test subjects and the energized antenna reduces the field intensity to which the birds are exposed and apparently the effects detrimental to orientation as well. Ways in which migrating birds might react to encountering the Sanguine field are discussed.

JPRS-64805 PC$5.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Some Aspects of the Biodynamics and Bioenergetics of the Organism in Normal and Pathological States, Biostimulation by Laser Radiation,
Yu. S. Korenkevich. 20 May 75, 106p
Trans. of mono. Nekotorye Voprosy Biodinamiki i Bioenergetiki Organizma v Norme i Pathologii, Biostimulyatsiya Lazernym Izlucheniem, Alma-Ata, 1971 p17-21, 47 (Part 1); p5-22, 26-29, 44, 59, 62-65, 70-79, 84-90, 101-103, 115-118, 152-156, 193-194, 197-200, 201-204 (Part 2).

Descriptors: *Radiation effects, Lasers, Biodynamics, Pathology, USSR, Translations, Therapy.
Identifiers: *Laser radiobiology.

Contents:
Comparative biodynamics of the histoarchitectonics of the spinal cord of the goat and sheep and of their wild counterparts;
Energy pathology and the question of laser radiation therapy;
An electrostatic model of remote effects;
The accumulation of bioelectric energy;
Recording the electric conductivity of acupuncture points;
Changes in the histostructure of the tests of some mammals in response to polarized red light;
The neutodynamics of ill and healthy animals in response to ultraviolet (UV) irradiation;
The modified galvanic skin response as a reactivity test in laser therapy;
Electronotherapy.

NTIS/PS-75/551/2GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Radiation Effects on Cells and Chromosomes (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Pernell W. Crockett. Jul 75, 114p*

Descriptors: *Bibliographies, *Radiobiology, *Cells(Biology), *Chromosomes, Cytology, Mutations, Cell physiology, Radiotherapy, Malignant neoplasms, Deoxyribonucleic acids, Radiation effects.
Identifiers: Molecular biology, Cancer.

Reports on the effects of radiation on cell physiology, chromosome aberrations, and DNA replication are cited. Mechanisms of radiotherapy on cancerous cells are discussed.

N75-23149/8GA PC$6.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Radiation and Protection.
U. Y. Margulis. Apr 75, 174p NASA-TT-F-16209
Contract NASW-2483
Tran-Transl. Into English from the Book "Radiatsiya I Zashchita" Moscow, Atomizdat, 1974 p 160.

Descriptors: *Radiation effects, *Radiation shielding, *Radioactive materials, *Radiobiology, Atomic structure, Dosimeters, Human reactions, Ionizing radiation, Radioactive wastes, Reactor safety.

For abstract, see STAR 1314

PAT-APPL-567 719/GA PC$3.75/MF$2.25
Department of Health, Education, and Welfare, Washington, D.C.
Fast Charge Digitizer and Digital Data Acquisition System for Measuring Time Varying Radiation Fields.
Patent Application,
F. R. Lee. Filed 14 Apr 75, 27p* DHEW-E-36-74
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Radiation measuring instruments, *Patent applications, *X rays, Data acquisition, Comparators, Multivibrators, Digital systems.

The patent application describes a radiation measuring instrument including a fast charge digitizer and a digital data acquisition system. The fast charge digitizer includes a charge integrator connected to a conventional ionization chamber which generates an output current in proportion to ionizing radiation exposure rate. The charge integrator has an output connected to a comparator which is switched from a high state to a low state when the output of the integrator goes above the comparator threshold.

6S. Stress Physiology

AD-A011 153/4GA PC$3.25/MF$2.25
Rochester Univ N Y Div of Urology
The Pathophysiology of Decompression Sickness: An Overview with Emphasis on Plasma and Lipid Changes.
Final rept.,

Abraham T. K. Cockett, Stephen M. Pauley, Donald N. Zehl, and Willia S. Cockett. 30 May 75, 17p Rept no. 5-29192
Contract N00014-67-A-0398-0008

Descriptors: *Decompression sickness, *Embolism, Hyperbaric conditions, Blood plasma, Stress(Physiology), Pathology, Lipids, Hematology, Compression, Therapy, Patients, Lung, Dextran.

Several significant findings or trends have been noted over the past 12 years. Lipid emboli coexist with gaseous emboli in moderately severe decompression sickness. Lipid emboli can be altered following early intravenous therapy. Dextran (LMW or MMW) is effective as an antilipemic clearing agent. An excellent colloidal expander, dextran should be used in the treatment of severe decompression sickness, particularly if a recompression chamber is miles away. Human divers may manifest changes in hematocrit, platelet and selected coagulation factors. These trends are of interest and can perhaps herald the onset of decompression sickness if the plasma changes are significantly altered beyond the levels shown by volunteer divers. The lungs serve as a primary target organ for trapping emboli. Disruption of alveoli at this site may lead to air embolism. Careful monitoring of the brain and eyeground can be of assistance in following the more severely afflicted patient.

AD-A011 295/3GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Acute Decompression Sickness.
Medical research progress rept.,
David H. Elliott, John M. Hallenbeck, and Alfred A. Bove. 1974, 17p
Availability: Pub. in The Lancet, p1193 • , 16 Nov 74.

Descriptors: *Decompression sickness, Pathology, Therapy, Sources, Diagnosis(Medicine), Reprints.

The long-standing concept of the bubble acting soley as a mechanical cause of decompression sickness, by tissue distortion or as an embolus, has lately been challenged, and recognition of surface activity at the blood/gas interface of the intravascular bubble has initiated a reconsideration of possible disease processes. The conventional view that spinal-cord damage in the decompression sickness of diving and compressed-air work is due to systemic embolisation has been challenged by evidence that obstruction of the epidural vertebral venous system is an important causal factor. It is encouraging to physicians concerned with the treatment of decompression illness that interfacial effects at the surface of intravascular bubbles provide the basis for a new approach to what is often a puzzling and difficult clinical situation. While immediate recompression to the depth of relief remains the primary treatment, other types of therapy are indicated in those who fail to respond and in those for whom there is no compression chamber readily available. (Author)

AD-A011 456/1GA PC$5.25/MF$2.25
Undersea Medical Society Bethesda Md
Proceedings of the Undersea Medical Society Workshop (8th) on the Strategy for Future Diving to Depths Greater than 1,000 Feet Held at Sea Ranch, California on 26-27 February 1975,
M. J. Halsey, W. Settle, and E. B. Smith. 15 Jun 75, 103p Rept no. WS-6-15-75
Contract N00014-74-C-0319
See also report dated 1973, AD-A009 584.

Descriptors: *Meetings, *Diving, Deep diving, Performance(Human), Stress(Physiology), Physicochemical properties, Medical research, Hyperbaric conditions, Anesthetics.

The report presents discussions dealing with all aspects of the subject problem. The following areas were stressed: Physico-chemical approaches, interaction of anaesthetics with proteins and bilayers, pressure and anaesthetics, performance during saturation dives, hydrostatic pressure effects in liquid breathing mice, sustained dives with mice up to depths of 8000 feet, application of the critical volume hypothesis to problems of deep diving, high pressure nervous syndrome--clinical and electrophysiological studies in man, practical limits to the use of man under pressure, and a strategy for future diving.

AD-A011 482/7GA PC$3.25/MF$2.25
Maryland Univ College Park
Cellular Viability, Metabolism and Growth Kinetics During Hyperthermia in the Physiological Range.
Rept. no. 2 (Final), 1 Feb 72-31 Aug 74,
Joshua R. C. Brown. 23 May 75, 10p ARO-11556.2-L
Grant DAHC19-72-G-0010
See also AD-A011 484.

Descriptors: *Cells(Biology), *Hyperthermia, Stability, Heat stress(Physiology), Tissue culture cells, Growth(Physiology), Mitosis, Proteins, Deoxyribonucleic acids, Nucleotides, Stress(Physiology).

A study of the effect of a 12-hour incubation at 40.5C on population growth, mitotic index, cell viability and rate of incorporation of 3H-thymidine into DNA, 3H-leucine into protein, and inorganic 32P into high energy nucleotides is presented. A summary of results of this investigation is given.

AD-A011 484/3GA PC$3.25/MF$2.25
Maryland Univ College Park
Cellular Viability, Metabolism and Growth Kinetics During Hyperthermia in the Physiological Range.
Rept. no. 3 (Final), 18 Jun 73-31 Aug 74,
Joshua R. C. Brown. 23 May 75, 11p ARO-11556.3-L
Grant DA-ARO-D-31-124-73-G196
See also AD-A011 482.

Descriptors: *Cells(Biology), *Hyperthermia, Stability, Heat stress(Physiology), Tissue culture cells, Growth(Physiology), Mitosis, Biosynthesis, Proteins, Deoxyribonucleic acids, Nucleotides, Stress(Physiology).

The objectives of the project are to: (1) Establish a dose response curve to hyperthermia between normal incubation temperature and 40.5C; (2) to investigate the mechanisms of thermal disruption of normal cellular activities and attempt to correlate temperature induced effects with changes in high energy nucleotide availability, or with the levels of other metabolic regulators; (3) to investigate the mechanisms of increased thermal stability in previously heat treated cell cultures. A brief outline of research findings is presented.

N75-23106/8GA PC$12.50/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Weightlessness, Medical and Biological Research.
V. V. Parin, O. G. Gazenko, Y. M. Yuganov, P. V. Vasilyev, and I. I. Kasyan. Mar 75, 543p NASA-TT-F-16105
Contract NASW-2481
Tran-Transl. Into English of the Book "Nevesemost: Mediko-Biologicheskiye Issledovaniye" Moscow, Meditsina Press, 1974 455 p.

Descriptors: *Aerospace medicine, *Apollo spacecraft, *Astronauts, *Gemini flights, *Physiological responses, *Salyut space station, *Soyuz spacecraft, *Weightlessness, Animals, Gravireceptors, Human reactions, Hypokinesia, Manned space flight, Prophylaxis, Space flight stress, Weightlessness simulation.

For abstract, see STAR 1314

N75-23134/0GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Life in Weightlessness.
J. Lavernhe. May 75, 5p NASA-TT-F-16361
Contract NASW-2481
Tran-Transl. Into English from Presse Med. (Paris), No. 48, 13 Nov. 1971 p 2190.

Descriptors: *Human body, *Pathological effects, *Physiological responses, *Weightlessness simulation, Aerospace medicine, Circulatory system, Metabolism, Psychological effects, Space flight stress.

For abstract, see STAR 1314

N75-23139/9GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Fitness for Air Travel, the Medical Point of View.
H. H. Renemann, K. Wink, and H. Reindell. May 75, 13p NASA-TT-F-16304
Contract NASW-2483
Tran-Transl. Into English from Med. Klin. (Munich), V. 69, No. 32/33, 1974 p 1311-1316.

Descriptors: *Air transportation, *Flight stress (Biology), *Heart diseases, *Patients, Aerospace medicine, Cardiology, Cardiovascular system, Flight fitness, Flight safety.

For abstract, see STAR 1314

N75-23146/4GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Experimental Study of Physiological Variations in Urinary Sodium and Potassium Related to Time Zone Changes.
J. P. Chevrier. May 75, 8p NASA-TT-F-16281
Contract NASW-2483
Tran-Transl. Into English from Compt. Rend. Soc. Biol. (Paris), V. 167, No. 12, 1973 p 2014-2018.

Descriptors: *Flight stress (Biology), *Human body, *Metabolic wastes, *Physiological responses, Aerospace medicine, Air transportation, Demineralizing, Flight time, Potassium, Sodium, Urinalysis.

For abstract, see STAR 1314

N75-23152/2GA PC$3.75/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Investigations on the Problem of Sleep Disturbances Caused by Supersonic Booms Experimentelle Untersuchungen Zum Problem der Schlafstoerungen durch Ueberschallknall.
G. Jansen, and B. Griefahn. 2 Jul 74, 37p ISL-21/74
Contract DRME-72/693
Language in German.

Descriptors: *Human reactions, *Noise tolerance, *Sleep, *Sonic booms, Brain, Electroencephalography, Environment simulation, Noise pollution, Peripheral circulation, Supersonic wind tunnels.

For abstract, see STAR 1314

6T. Toxicology

AD-A011 243/3GA PC$3.25/MF$2.25
Army Environmental Hygiene Agency Aberdeen Proving Ground Md

Primary Irritation Evaluation of Candidate Insect Repellent.
Final rept. Apr-May 75,
LeRoy W. Metker. May 75, 7p Rept no. USAEHA-51-107-75
See also report dated Apr 75, AD-A007 736.

Descriptors: *Insect repellents, *Irritant compounds, Bioassay, Rabbits, Laboratory animals, Skin(Anatomy), Eye, Experimental data, Army, Toxicology, Humans.
Identifiers: Evaluation, Recommendations.

AI3-36408-Ga which is a candidate insect repellent proposed for use by the Army, was evaluated on New Zealand White rabbits for its potential to cause skin and eye irritation. The data obtained serve as a basis for making a recommendation concerning its potential use on humans. This recommendation is intended only for guidance in further entomological testing of this compound.

AD-A011 260/7GA PC$4.25/MF$2.25
Edgewood Arsenal Aberdeen Proving Ground Md
Toxicological Basis for Controlling Levels of Mustard in the Environment.
Special pub. Nov 70-Dec 71,
B. P. McNamara, E. J. Owens, M. K. Christensen, F. J. Vocci, and D. F. Ford. Jun 75, 61p Rept no. EB-SP-74030
Report on Mustard Sensitivity Studies.

Descriptors: *Mustard agents, *Toxicology, Teratogenic compounds, Exposure(Physiology), Laboratory animals, Inhalation, Pathology, Blood chemistry, Eye, Bioassay, Experimental data, Mortality rates, Mutagens, Dosage, Skin(Anatomy), Respiratory system, Carcinogens.
Identifiers: Mustard gas.

Very little quantitative information exists on the toxicological effects of repeated exposures to small doses or low concentrations of mustard (HD). Such data are required to verify the adequacy of controls to prevent hazards to handlers and to the general population. The effects of repeated exposures to HD vapors in dogs, rabbits, guinea pigs, rats, and mice were studied. The variety of observations made included general toxicity, skin and eye effects, blood chemistry, sensitization, mutagenesis, teratogenesis, carcinogenicity, and other pathological effects. Based on the data accumulated, control limits and ceiling values are proposed. A control limit is the maximum average airborne concentration of a substance to which it is believed that essentially all members of a specified population can be exposed for a specified period without adverse effects.

AD-A011 462/9GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Acute Toxicity of Beryllium Sulfate to Salamander Larvae ('Ambystoma spp'),
Arnold R. Slonim, and Edwin E. Ray. 1975, 8p Rept no. AMRL-TR-74-83
Availability: Pub. in Bulletin of Environmental Contamination and Toxicology, v13 n3 p307-312 1975.

Descriptors: *Beryllium compounds, *Sulfates, *Toxicity, *Larvae, Amphibians, Bioassay, Reprints.
Identifiers: Salamanders, Ambystoma.

The acute toxicity of beryllium sulfate to another class of organisms, the amphibians, was investigated using the same bioassay technique as reported previously with the guppies. The larvae of two species of salamanders (Ambystoma), which are usually larger than guppies, were used in this study. Amphibians, long used in organ regeneration experimentation, have been used in the past in beryllium studies. The results of four static bioassays, two of which were conducted simultaneously using larvae of different size, respectively, are reported in this paper.

AD-A011 538/6GA PC$4.75/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
A Review of the Toxicology of Halogenated Fire Extinguishing Agents.
Final rept.,
E. W. van Stee. Nov 74, 88p Rept no. AMRL-TR-74-143

Descriptors: *Toxicology, *Fire extinguishing agents, *Halogenated hydrocarbons, Lethal dosage, Physiological effects, Central nervous system, Cardiovascular system, Exposure(Physiology), Inhalation, Behavior, Performance(Human), Laboratory animals, Experimental data, Bioassay.
Identifiers: Methane/bromo-chloro-difluoro, Methane/chloro-bromo, Methane/bromo-trifluoro, Evaluation.

Bromotrifluoromethane (Halon 1301), bromochlorodifluoromethane (Halon 1211), and chlorobromomethane (Halon 1011) were evaluated for toxicity and toxic hazards. The most important toxicological effects of these compounds are on the central nervous and cardiovascular systems. The neurological effects are manifested as alterations of perception and a reduction in reaction time and the ability to concentrate on complex intellectual tasks. The cardiovascular effects are manifested as changes in cardiovascular dynamics and the electrical activity of the heart. Clinically important central nervous system effects generally appear at lower levels of exposure than clinically important cardiovascular effects. Behavioral changes and performance decrements during exposure would undoubtedly have some effect on the interaction of the subject with his environment, and such consequences of exposure could be life-threatening.

AD-A011 548/5GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Effects of Monomethylhydrazine on Red Blood Cell Metabolism.
Technical rept.,
Marilyn E. George. Mar 75, 19p Rept no. AMRL-TR-74-87

Descriptors: *Methyl hydrazines, *Toxicology, *Erythrocytes, Liquid rocket oxidizers, Hemoglobin, In vitro analysis, Exposure(Physiology), Membranes(Biology), Physiological effects, Experimental data, Humans, Hemolysis, Dosage, Metabolism, Hematology.
Identifiers: Hydrazine/methyl, Heinz bodies.

Monomethylhydrazine is used in various Air Force propellant systems. Chronic exposure to low concentrations of this compound results in an anemia characterized by methemoglobinemia, decreased levels of reduced glutathione and Heinz body formation. The study reported here was designed to determine if Heinz body formation was the principal mechanism of the red cell destruction or if MMH also had effects on the glycolytic pathways and/or red cell membranes which would contribute to the hemolytic mechanism. Human red cells were exposed in vitro to three levels of MMH for two, four, or six hours. Glucose utilization, lactate production and ATP levels were measured to determine effects on glucose metabolism; and osmotic fragilities, red cell potassium concentration, and malonyldialdehyde levels were measured to assess membrane effects.

AD-A011 555/0GA PC$3.75/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Exposure of Dog Erythrocytes In vivo to Phenylhydrazine and Monomethylhydrazine: A Freeze-Etch Study of Erythrocyte Damage.
Final rept.,
Charles E. Witchett. Mar 75, 33p Rept no. AMRL-TR-74-88

Descriptors: *Erythrocytes, *Hydrazine, *Toxicology, Hematology, Dogs, Laboratory animals, In vivo analysis, Experimental data, Physiological effects, Pathology, Methyl hydrazines, Exposure(Physiology), Dosage, Inhalation, Hemoglobin, Liquid rocket oxidizers.
Identifiers: Hydrazine/phenyl, Hydrazine/methyl, Heinz bodies.

Dog red blood cells were exposed in vivo to phenylhydrazine or monomethylhydrazine by injecting the dogs subcutaneously with these compounds. The cell damage was evidenced clinically by hemolytic anemia at all concentrations in the phenylhydrazine exposed animals. In contrast, there was little clinical evidence in monomethylhydrazine cells except at the highest concentration. The freeze-cleave technique showed that phenylhydrazine exposed erythrocytes contained Heinz bodies within two hours. The Heinz bodies formed in the central cytoplasm and migrated to the membrane. The membrane was evaginated and dimpled where Heinz bodies were near the membrane and this might represent the damage which initiates sequestration of erythrocytes by the spleen and liver. The freeze-cleave technique showed that monomethylhydrazine treated cells did not produce typical Heinz bodies, but did produce aggregates of granules arranged in ordered rows which may represent hemoglobin crystals.

AD-A011 559/2GA PC$7.25/MF$2.25
California Univ Irvine
Toxic Hazards Research Unit Annual Technical Report: 1974.
Final rept., Jun 73-May 74,
J. D. MacEwen, and E. H. Vernot. Jul 74, 202p AMRL-TR-74-78
Contract F33615-73-C-4059
Joint NIOSH/USAF/NASA Study. See also report dated Aug 73, AD-771 025.

Descriptors: *Toxic agents, *Toxicology, *Inhalation, Benzonitriles, Fluorides, Deuterium compounds, Aircraft, Fuels, Coal tar, Aerosols, Hydrazine, Fuel additives, Photographic chemicals, Chlorine compounds.

Acute inhalation toxicity experiments were conducted on benzonitrile, deuterium fluoride and fluomine. Chronic toxicity studies were conducted with an aircraft fuel JP-4 and constituents of JP-9. Chronic studies of coal tar aerosols and hydrazine were also continued. Oral and percutaneous toxicity determination and skin irritation and sensitization studies were conducted on a number of fuel additives and photographic chemicals.

AD-A011 563/4GA PC$10.50/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Proceedings of the Annual Conference on Environmental Toxicology (5th) Held at Fairborn, Ohio, on 24, 25, and 26 September 1974.
Final rept.
Dec 74, 411p Rept no. AMRL-TR-74-125
See also AD-781 031.

Descriptors: *Meetings, *Toxicology, *Ecology, Environments, Toxic hazards, Carcinogens, Inhalation, Water pollution, Pathology, Fire extinguishing agents, Models, Cells(Biology), Lung, Exposure(Physiology), Chemicals, Gases.
Identifiers: Ecosystems.

The major technical areas discussed included ecosystem modeling, water pollution, water reuse, toxic hazards evaluation of fire extinguishants, environmental carcinogenesis, and cellular toxicology.

AD-A011 578/2GA PC$3.25/MF$2.25
California Univ Los Angeles School of Medicine
Unilateral Sensory-Motor-Rhythm (SMR) Training in Cats: A Basis for Testing Neurophysiological and Behavioral Effects of Monomethylhydrazine (MMH).
Final rept. 1 Apr 72-31 Mar 73,
M. D. Fairchild, and M. B. Sterman. Jul 74, 22p
AMRL-TR-73-123
Contract F33615-72-C-1855

Descriptors: *Toxicology, *Methyl hydrazines, Senses(Physiology), Liquid rocket oxidizers, Cats, Experimental data, Brain, Physiological effects, Exposure(Physiology), Central nervous system, Therapy, Electroencephalography.
Identifiers: *Hydrazine/methyl, Evoked responses, Sensory motor coordination, *Neurophysiology.

Cats were trained to produce sensory-motor rhythm (SMR) in one brain hemisphere and to suppress it in the contralateral hemisphere. Rewarding brain stimulation was delivered automatically to the lateral hypothalamus when trains of SMR of specified duration and amplitude appeared only in the trained hemisphere. Evoked potentials induced bilaterally in the sensory-motor cortex by stimulation of radiations from the nucleus ventralis posteriolateralis of the thalamus were photographed and measured prior to, during, and following training. Unilateral SMR production could be achieved, but this training procedure had no systematic effect on thalamocortical evoked potentials; although changes unique to each of the three animals tested occurred more frequently in the trained hemisphere.

JPRS-64966 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Prediction of Toxic Effects and Cleansing of Air,
V. Z. Aksel-Rubinshteyn, L. A. Tiunov, M. M. Gimadeev, and F. F. Daumov. 10 Jun 75, 12p
Trans. of Gigiena i Sanitariya (USSR) v85 n7 p85-89 1974.

Descriptors: *Toxicology, Contaminants, Industrial hygiene, USSR, Translations, Poisons, Chemical plants, Photochemical reactions, Air pollution.
Identifiers: *Air pollution effects(Humans), *Air pollution control, Synergistic effects of air pollutants.

Contents:
- Prediction of the toxic effect from the interaction of chemical substances in the air;
- Effectiveness of measures for cleansing atmospheric air in the region of the Kazan Organic Synthesis Plant.

PB-242 293/9GA PC$5.75/MF$2.25
Little (Arthur D.), Inc., Cambridge, Mass.
Literature Study of Selected Potential Environmental Contaminants, Titanium Dioxide.
Final rept.
May 75, 131p* ADL-C-77354 EPA/560/2-75-001
Contract EPA-68-01-2688

Descriptors: *Titanium dioxide, *Reviews, *Air pollution, *Water pollution, Physical properties, Chemical properties, Toxicity, Dust, Production, Chemical industry, Bibliographies, Exposure, Public health.
Identifiers: Air pollution effects(Humans), Air pollution effects(Animals).

A comprehensive review of the literature published since 1 January 1954 was conducted to prepare this preliminary report on the physical and chemical properties of titanium dioxide (TiO_2), on the environmental exposure factors related to its consumption and use, on the health and environmental effects resulting from exposure to TiO_2, and on the regulations and standards governing its use. Current problems include concern about the future availability of rutile ore to supply the increasing number of facilities using this ore in the chloride manufacturing process, and the disposal of the high volume of TiO_2 manufacturing wastes, particularly the spent sulfuric acid and ferrous sulfate from the sulfate manufacturing process. On the basis of reported information, TiO_2 does not pose substantial environmental hazard.

PB-242 480/2GA PC$5.25/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
An Investigation of Consumers' Perceptions of Adverse Reactions to Cosmetic Products.
Final rept.
Jun 75, 106p* FDA-223-73-8052
Contract FDA-223-73-8052
Paper copy also available in set of 2 reports as PB-242 479-SET, PC$10.00.

Descriptors: *Toxicology, Epidemiology, Consumers, Injuries, Consumption, Dermatology, United States, Eye injuries, Damage, Pathology, Epidemiology, Surveys, Physiological effects, Utilization.
Identifiers: *Cosmetics, Consumer participation, *Product safety, *Consumer protection.

10,000 households in United States kept diaries of cosmetic usage for three months and reported perceived injuries. Reports were investigated by dermatologists for cosmetic-relatedness and severity of injury. Primary purpose of the study was to obtain an estimate of the number and types of cosmetic injuries relative to usage patterns for a selected panel on consumers.

PB-242 481/0GA PC$5.75/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
An Investigation of Consumers' Perceptions of Adverse Reactions to Cosmetic Products. Appendices.
Final rept.
Jun 75, 138p* FDA-223-73-8052-APP
Contract FDA-223-73-8052
Paper copy also available in set of 2 reports as PB-242 479-SET, PC$10.00.

Descriptors: *Toxicology, Injuries, United States, Questionnaires, Surveys, Epidemiology, Physiological effects, Damage.
Identifiers: *Cosmetics, *Consumer protection, *Product safety, Consumer participation.

Contents:
- Invitation letter;
- Introduction letter;
- Medical history report form;
- Note to Maryland panel households;
- Reminder to panel households;
- Cover letter for diary-October, November;
- September diary form;
- October diary form;
- November diary form;
- Adverse incident report interview questionnaire;
- Adverse reaction incident report coding sheet for primary symptoms;
- Cosmetic injury report form for physicians;
- Validation survey of panel households with return diaries-September, October, November;
- Validation survey of panel households without diaries-September, October, November.

7. CHEMISTRY

7A. Chemical Engineering

N75-22486/5GA PC$6.25/MF$2.25
Union Carbide Corp., Tonawanda, N.Y. Linde Div.
Survey Study of the Efficiency and Economics of Hydrogen Liquefaction.
8 Apr 75, 158p NASA-CR-132631
Contract NAS1-13395

Descriptors: *Economic factors, *Liquefaction, *Liquid hydrogen, Coal, Combustion efficiency, Fuels, Surveys.

For abstract, see STAR 1314

PB-242 159/2GA PC$4.75/MF$2.25
Houston Univ., Tex.
An Integrated Power Process Model of Water Use and Wastewater Treatment in Chlorine Caustic Production,
F. D. Singleton, Jr., James A. Calloway, and Russell G. Thompson. 1975, 92p NSF/RA/E-74-048
Grant NSF-GI-34459

Descriptors: *Water consumption, *Chemical industry, *Water pollution control, Alkalies, Chlorine, Waste water, Standards, Industrial plants, Industrial wastes, Production methods, Cost analysis, Economic models, Linear programming, Flow charts.
Identifiers: Chlorine caustic plants, Energy consumption.

An economic evaluation was made of the effects of increasingly restrictive wastewater effluent standards and higher costs of water withdrawals on resource use, waste discharges, and costs of producing chlorine caustic. Both mercury cell and diaphragm cell methods of production were studied for large modern plants at the design stage. Zero discharges of total solids in diaphragm cell plants increased production costs 5.6%; zero discharges of total solids in mercury cell plants increased production costs 12.1%. Zero discharge restrictions of mercury may only be accomplished by use of diaphragm cells.

PB-242 461/2GA PC$5.75/MF$2.25
Maryland Environmental Service, Annapolis, Md.
Preliminary Design of a Comprehensive Waste Oil Processing Facility.
Final rept.,
Garth D. Gumtz, and Edward J. Martin. May 75, 142p* EPA/670/2-75-056
Grant EPA-S-800650
Prepared in cooperation with Environmental Quality Systems, Inc., Rockville, Md.

Descriptors: *Waste disposal, *Liquid waste disposal, *Lubricating oils, *Materials recovery, Industrial plants, Maryland, Design, Construction costs, Refining, Refineries, Cost estimates, Fuel oil, Solvent extraction, Incinerators, Operating costs.
Identifiers: *Oil wastes, *Waste recycling, Oil storage.

A preliminary design is presented for a comprehensive waste oil recovery and disposal facility for the State of Maryland. The base for this design was an annual state-wide waste oil generation of 22,000,000 gallons which includes all known waste oil sources. With a 90 percent stream factor, feed to the plant is 66,000 gallons per day.

PB-242 547/8GA PC$4.75/MF$2.25
Air Products and Chemicals, Inc., Marcus Hook, Pa. Houdry Div.

Primary Irritation Evaluation of Candidate Insect Repellent.
Final rept. Apr-May 75,
LeRoy W. Metker. May 75, 7p Rept no. USAEHA-51-107-75
See also report dated Apr 75, AD-A007 736.

Descriptors: *Insect repellents, *Irritant compounds, Bioassay, Rabbits, Laboratory animals, Skin(Anatomy), Eye, Experimental data, Army, Toxicology, Humans.
Identifiers: Evaluation, Recommendations.

AI3-36408-Ga which is a candidate insect repellent proposed for use by the Army, was evaluated on New Zealand White rabbits for its potential to cause skin and eye irritation. The data obtained serve as a basis for making a recommendation concerning its potential use on humans. This recommendation is intended only for guidance in further entomological testing of this compound.

AD-A011 260/7GA PC$4.25/MF$2.25
Edgewood Arsenal Aberdeen Proving Ground Md
Toxicological Basis for Controlling Levels of Mustard in the Environment.
Special pub. Nov 70-Dec 71,
B. P. McNamara, E. J. Owens, M. K. Christensen, F. J. Vocci, and D. F. Ford. Jun 75, 61p Rept no. EB-SP-74030
Report on Mustard Sensitivity Studies.

Descriptors: *Mustard agents, *Toxicology, Teratogenic compounds, Exposure(Physiology), Laboratory animals, Inhalation, Pathology, Blood chemistry, Eye, Bioassay, Experimental data, Mortality rates, Mutagens, Dosage, Skin(Anatomy), Respiratory system, Carcinogens.
Identifiers: Mustard gas.

Very little quantitative information exists on the toxicological effects of repeated exposures to small doses or low concentrations of mustard (HD). Such data are required to verify the adequacy of controls to prevent hazards to handlers and to the general population. The effects of repeated exposures to HD vapors in dogs, rabbits, guinea pigs, rats, and mice were studied. The variety of observations made included general toxicity, skin and eye effects, blood chemistry, sensitization, mutagenesis, teratogenesis, carcinogenicity, and other pathological effects. Based on the data accumulated, control limits and ceiling values are proposed. A control limit is the maximum average airborne concentration of a substance to which it is believed that essentially all members of a specified population can be exposed for a specified period without adverse effects.

AD-A011 462/9GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Acute Toxicity of Beryllium Sulfate to Salamander Larvae ('Ambystoma spp'),
Arnold R. Slonim, and Edwin E. Ray. 1975, 8p Rept no. AMRL-TR-74-83
Availability: Pub. in Bulletin of Environmental Contamination and Toxicology, v13 n3 p307-312 1975.

Descriptors: *Beryllium compounds, *Sulfates, *Toxicity, *Larvae, Amphibians, Bioassay, Reprints.
Identifiers: Salamanders, Ambystoma.

The acute toxicity of beryllium sulfate to another class of organisms, the amphibians, was investigated using the same bioassay technique as reported previously with the guppies. The larvae of two species of salamanders (Ambystoma), which are usually larger than guppies, were used in this study. Amphibians, long used in organ regeneration experimentation, have been used in the past in beryllium studies. The results of four static bioassays, two of which were conducted simultaneously using larvae of different size, respectively, are reported in this paper.

AD-A011 538/6GA PC$4.75/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
A Review of the Toxicology of Halogenated Fire Extinguishing Agents.
Final rept.,
E. W. van Stee. Nov 74, 88p Rept no. AMRL-TR-74-143

Descriptors: *Toxicology, *Fire extinguishing agents, *Halogenated hydrocarbons, Lethal dosage, Physiological effects, Central nervous system, Cardiovascular system, Exposure(Physiology), Inhalation, Behavior, Performance(Human), Laboratory animals, Experimental data, Bioassay.
Identifiers: Methane/bromo-chloro-difluoro, Methane/chloro-bromo, Methane/bromo-trifluoro, Evaluation.

Bromotrifluoromethane (Halon 1301), bromochlorodifluoromethane (Halon 1211), and chlorobromomethane (Halon 1011) were evaluated for toxicity and toxic hazards. The most important toxicological effects of these compounds are on the central nervous and cardiovascular systems. The neurological effects are manifested as alterations of perception and a reduction in reaction time and the ability to concentrate on complex intellectual tasks. The cardiovascular effects are manifested as changes in cardiovascular dynamics and the electrical activity of the heart. Clinically important central nervous system effects generally appear at lower levels of exposure than clinically important cardiovascular effects. Behavioral changes and performance decrements during exposure would undoubtedly have some effect on the interaction of the subject with his environment, and such consequences of exposure could be life-threatening.

AD-A011 548/5GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Effects of Monomethylhydrazine on Red Blood Cell Metabolism.
Technical rept.,
Marilyn E. George. Mar 75, 19p Rept no. AMRL-TR-74-87

Descriptors: *Methyl hydrazines, *Toxicology, *Erythrocytes, Liquid rocket oxidizers, Hemoglobin, In vitro analysis, Exposure(Physiology), Membranes(Biology), Physiological effects, Experimental data, Humans, Hemolysis, Dosage, Metabolism, Hematology.
Identifiers: Hydrazine/methyl, Heinz bodies.

Monomethylhydrazine is used in various Air Force propellant systems. Chronic exposure to low concentrations of this compound results in an anemia characterized by methemoglobinemia, decreased levels of reduced glutathione and Heinz body formation. The study reported here was designed to determine if Heinz body formation was the principal mechanism of the red cell destruction or if MMH also had effects on the glycolytic pathways and/or red cell membranes which would contribute to the hemolytic mechanism. Human red cells were exposed in vitro to three levels of MMH for two, four, or six hours. Glucose utilization, lactate production and ATP levels were measured to determine effects on glucose metabolism; and osmotic fragilities, red cell potassium concentration, and malonyldialdehyde levels were measured to assess membrane effects.

AD-A011 555/0GA PC$3.75/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Exposure of Dog Erythrocytes In vivo to Phenylhydrazine and Monomethylhydrazine: A Freeze-Etch Study of Erythrocyte Damage.
Final rept.,
Charles E. Witchett. Mar 75, 33p Rept no. AMRL-TR-74-88

Descriptors: *Erythrocytes, *Hydrazine, *Toxicology, Hematology, Dogs, Laboratory animals, In vivo analysis, Experimental data, Physiological effects, Pathology, Methyl hydrazines, Exposure(Physiology), Dosage, Inhalation, Hemoglobin, Liquid rocket oxidizers.
Identifiers: Hydrazine/phenyl, Hydrazine/methyl, Heinz bodies.

Dog red blood cells were exposed in vivo to phenylhydrazine or monomethylhydrazine by injecting the dogs subcutaneously with these compounds. The cell damage was evidenced clinically by hemolytic anemia at all concentrations in the phenylhydrazine exposed animals. In contrast, there was little clinical evidence in monomethylhydrazine cells except at the highest concentration. The freeze-cleave technique showed that phenylhydrazine exposed erythrocytes contained Heinz bodies within two hours. The Heinz bodies formed in the central cytoplasm and migrated to the membrane. The membrane was evaginated and dimpled where Heinz bodies were near the membrane and this might represent the damage which initiates sequestration of erythrocytes by the spleen and liver. The freeze-cleave technique showed that monomethylhydrazine treated cells did not produce typical Heinz bodies, but did produce aggregates of granules arranged in ordered rows which may represent hemoglobin crystals.

AD-A011 559/2GA PC$7.25/MF$2.25
California Univ Irvine
Toxic Hazards Research Unit Annual Technical Report: 1974.
Final rept., Jun 73-May 74,
J. D. MacEwen, and E. H. Vernot. Jul 74, 202p AMRL-TR-74-78
Contract F33615-73-C-4059
Joint NIOSH/USAF/NASA Study. See also report dated Aug 73, AD-771 025.

Descriptors: *Toxic agents, *Toxicology, *Inhalation, Benzonitriles, Fluorides, Deuterium compounds, Aircraft, Fuels, Coal tar, Aerosols, Hydrazine, Fuel additives, Photographic chemicals, Chlorine compounds.

Acute inhalation toxicity experiments were conducted on benzonitrile, deuterium fluoride and fluomine. Chronic toxicity studies were conducted with an aircraft fuel JP-4 and constituents of JP-9. Chronic studies of coal tar aerosols and hydrazine were also continued. Oral and percutaneous toxicity determination and skin irritation and sensitization studies were conducted on a number of fuel additives and photographic chemicals.

AD-A011 563/4GA PC$10.50/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Proceedings of the Annual Conference on Environmental Toxicology (5th) Held at Fairborn, Ohio, on 24, 25, and 26 September 1974.
Final rept.
Dec 74, 411p Rept no. AMRL-TR-74-125
See also AD-781 031.

Descriptors: *Meetings, *Toxicology, *Ecology, Environments, Toxic hazards, Carcinogens, Inhalation, Water pollution, Pathology, Fire extinguishing agents, Models, Cells(Biology), Lung, Exposure(Physiology), Chemicals, Gases.
Identifiers: Ecosystems.

The major technical areas discussed included ecosystem modeling, water pollution, water reuse, toxic hazards evaluation of fire extinguishants, environmental carcinogenesis, and cellular toxicology.

AD-A011 578/2GA PC$3.25/MF$2.25
California Univ Los Angeles School of Medicine
Unilateral Sensory-Motor-Rhythm (SMR) Training in Cats: A Basis for Testing Neurophysiological and Behavioral Effects of Monomethylhydrazine (MMH).
Final rept. 1 Apr 72-31 Mar 73,
M. D. Fairchild, and M. B. Sterman. Jul 74, 22p
AMRL-TR-73-123
Contract F33615-72-C-1855

Descriptors: *Toxicology, *Methyl hydrazines, Senses(Physiology), Liquid rocket oxidizers, Cats, Experimental data, Brain, Physiological effects, Exposure(Physiology), Central nervous system, Therapy, Electroencephalography.
Identifiers: *Hydrazine/methyl, Evoked responses, Sensory motor coordination, *Neurophysiology.

Cats were trained to produce sensory-motor rhythm (SMR) in one brain hemisphere and to suppress it in the contralateral hemisphere. Rewarding brain stimulation was delivered automatically to the lateral hypothalamus when trains of SMR of specified duration and amplitude appeared only in the trained hemisphere. Evoked potentials induced bilaterally in the sensory-motor cortex by stimulation of radiations from the nucleus ventralis posteriolateralis of the thalamus were photographed and measured prior to, during, and following training. Unilateral SMR production could be achieved, but this training procedure had no systematic effect on thalamocortical evoked potentials; although changes unique to each of the three animals tested occurred more frequently in the trained hemisphere.

JPRS-64966 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Prediction of Toxic Effects and Cleansing of Air,
V. Z. Aksel-Rubinshteyn, L. A. Tiunov, M. M. Gimadeev, and F. F. Daumov. 10 Jun 75, 12p
Trans. of Gigiena i Sanitariya (USSR) v85 n7 p85-89 1974.

Descriptors: *Toxicology, Contaminants, Industrial hygiene, USSR, Translations, Poisons, Chemical plants, Photochemical reactions, Air pollution.
Identifiers: *Air pollution effects(Humans), *Air pollution control, Synergistic effects of air pollutants.

Contents:
Prediction of the toxic effect from the interaction of chemical substances in the air;
Effectiveness of measures for cleansing atmospheric air in the region of the Kazan Organic Synthesis Plant.

PB-242 293/9GA PC$5.75/MF$2.25
Little (Arthur D.), Inc., Cambridge, Mass.
Literature Study of Selected Potential Environmental Contaminants, Titanium Dioxide.
Final rept.
May 75, 131p* ADL-C-77354 EPA/560/2-75-001
Contract EPA-68-01-2688

Descriptors: *Titanium dioxide, *Reviews, *Air pollution, *Water pollution, Physical properties, Chemical properties, Toxicity, Dust, Production, Chemical industry, Bibliographies, Exposure, Public health.
Identifiers: Air pollution effects(Humans), Air pollution effects(Animals).

A comprehensive review of the literature published since 1 January 1954 was conducted to prepare this preliminary report on the physical and chemical properties of titanium dioxide (TiO2), on the environmental exposure factors related to its consumption and use, on the health and environmental effects resulting from exposure to TiO2, and on the regulations and standards governing its use. Current problems include concern about the future availability of rutile ore to supply the increasing number of facilities using this ore in the chloride manufacturing process, and the disposal of the high volume of TiO2 manufacturing wastes, particularly the spent sulfuric acid and ferrous sulfate from the sulfate manufacturing process. On the basis of reported information, TiO2 does not pose substantial environmental hazard.

PB-242 480/2GA PC$5.25/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
An Investigation of Consumers' Perceptions of Adverse Reactions to Cosmetic Products.
Final rept.
Jun 75, 106p* FDA-223-73-8052
Contract FDA-223-73-8052
Paper copy also available in set of 2 reports as PB-242 479-SET, PC$10.00.

Descriptors: *Toxicology, Epidemiology, Consumers, Injuries, Consumption, Dermatology, United States, Eye injuries, Damage, Pathology, Epidemiology, Surveys, Physiological effects, Utilization.
Identifiers: *Cosmetics, Consumer participation, *Product safety, *Consumer protection.

10,000 households in United States kept diaries of cosmetic usage for three months and reported perceived injuries. Reports were investigated by dermatologists for cosmetic-relatedness and severity of injury. Primary purpose of the study was to obtain an estimate of the number and types of cosmetic injuries relative to usage patterns for a selected panel on consumers.

PB-242 481/0GA PC$5.75/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
An Investigation of Consumers' Perceptions of Adverse Reactions to Cosmetic Products. Appendices.
Final rept.
Jun 75, 138p* FDA-223-73-8052-APP
Contract FDA-223-73-8052
Paper copy also available in set of 2 reports as PB-242 479-SET, PC$10.00.

Descriptors: *Toxicology, Injuries, United States, Questionnaires, Surveys, Epidemiology, Physiological effects, Damage.
Identifiers: *Cosmetics, *Consumer protection, *Product safety, Consumer participation.

Contents:
Invitation letter;
Introduction letter;
Medical history report form;
Note to Maryland panel households;
Reminder to panel households;
Cover letter for diary-October, November;
September diary form;
October diary form;
November diary form;
Adverse incident report interview questionnaire;
Adverse reaction incident report coding sheet for primary symptoms;
Cosmetic injury report form for physicians;
Validation survey of panel households with return diaries-September, October, November;
Validation survey of panel households without diaries-September, October, November.

7. CHEMISTRY

7A. Chemical Engineering

N75-22486/5GA PC$6.25/MF$2.25
Union Carbide Corp., Tonawanda, N.Y. Linde Div.
Survey Study of the Efficiency and Economics of Hydrogen Liquefaction.
8 Apr 75, 158p NASA-CR-132631
Contract NAS1-13395

Descriptors: *Economic factors, *Liquefaction, *Liquid hydrogen, Coal, Combustion efficiency, Fuels, Surveys.

For abstract, see STAR 1314

PB-242 159/2GA PC$4.75/MF$2.25
Houston Univ., Tex.
An Integrated Power Process Model of Water Use and Wastewater Treatment in Chlorine Caustic Production,
F. D. Singleton, Jr., James A. Calloway, and Russell G. Thompson. 1975, 92p NSF/RA/E-74-048
Grant NSF-GI-34459

Descriptors: *Water consumption, *Chemical industry, *Water pollution control, Alkalies, Chlorine, Waste water, Standards, Industrial plants, Industrial wastes, Production methods, Cost analysis, Economic models, Linear programming, Flow charts.
Identifiers: Chlorine caustic plants, Energy consumption.

An economic evaluation was made of the effects of increasingly restrictive wastewater effluent standards and higher costs of water withdrawals on resource use, waste discharges, and costs of producing chlorine caustic. Both mercury cell and diaphragm cell methods of production were studied for large modern plants at the design stage. Zero discharges of total solids in diaphragm cell plants increased production costs 5.6%; zero discharges of total solids in mercury cell plants increased production costs 12.1%. Zero discharge restrictions of mercury may only be accomplished by use of diaphragm cells.

PB-242 461/2GA PC$5.75/MF$2.25
Maryland Environmental Service, Annapolis, Md.
Preliminary Design of a Comprehensive Waste Oil Processing Facility.
Final rept.,
Garth D. Gumtz, and Edward J. Martin. May 75, 142p* EPA/670/2-75-056
Grant EPA-S-800650
Prepared in cooperation with Environmental Quality Systems, Inc., Rockville, Md.

Descriptors: *Waste disposal, *Liquid waste disposal, *Lubricating oils, *Materials recovery, Industrial plants, Maryland, Design, Construction costs, Refining, Refineries, Cost estimates, Fuel oil, Solvent extraction, Incinerators, Operating costs.
Identifiers: *Oil wastes, *Waste recycling, Oil storage.

A preliminary design is presented for a comprehensive waste oil recovery and disposal facility for the State of Maryland. The base for this design was an annual state-wide waste oil generation of 22,000,000 gallons which includes all known waste oil sources. With a 90 percent stream factor, feed to the plant is 66,000 gallons per day.

PB-242 547/8GA PC$4.75/MF$2.25
Air Products and Chemicals, Inc., Marcus Hook, Pa. Houdry Div.

Engineering and Cost Study of Air Pollution Control for the Petrochemical Industry Volume 5: Formaldehyde Manufacture with the Mixed Oxide Catalyst Process.
Final rept.,
R. B. Morris, F. B. Higgins, Jr., L. A. Lee, R. Newirth, and J. W. Pervier. Mar 75, 82p
EPA/450/3-73-006-e
Contract EPA-68-02-0255
See also Volume 4, PB-242 118.

Descriptors: *Formaldehyde, Capitalized costs, Oxides, Catalysts, Manufacturing, Synthesis(Chemistry), Air pollution control equipment, Cost estimates, Operating costs, Chemical industry, Methyl alcohol, Hydrocarbons, Carbon monoxide.
Identifiers: *Air pollution control, *Petrochemical industry.

This document is one of a series prepared for the Environmental Protection Agency (EPA) to assist it in determining those petrochemical processes for which standards should be promulgated. This volume covers the manufacture of formaldehyde with the mixed oxide catalyst process. Included is a process and industry description, an engineering description of available emission control systems, the cost of these systems, and the financial impact of emission control on the industry. Also presented are suggested air episode procedures and plant inspection procedures.

PB-242 572/6GA PC$15.25/MF$2.25
National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.
Proceedings: Symposium on Flue Gas Desulfurization, Held in Atlanta, Ga., on November 1974. Volume I.
Dec 74, 661p* EPA/650/2-74-126-a
Paper copy also available in set of 2 reports as PB-242 571-SET, PC$26.00.

Descriptors: *Meetings, *Flue gases, *Desulfurization, *Sulfur oxides, Cost estimates, Regeneration(Engineering), Sulfur dioxide, Reviews, Scrubbers, Limestone, Absorbers(Materials), Air pollution control equipment, Sludge disposal, Performance evaluation.
Identifiers: *Air pollution control, Limestone scrubbing, Alkaline scrubbing.

The proceedings document the presentations made during the symposium, which dealt with the status of flue gas desulfurization technology, both in the U.S. and abroad. The presentations emphasize process costs, both regenerable and non-regenerable processes, second generation processes, and byproduct disposal/utilization. Aim of the symposium was to provide potential users of sulfur oxide control technology with a current review of progress made in applying processes for the reduction of sulfur oxide emissions at the full- or semi-commercial scale. This volume covers the opening session and the non-regenerable processes session.

PB-242 573/4GA PC$12.25/MF$2.25
National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.
Proceedings: Symposium on Flue Gas Desulfurization, Held in Atlanta, Ga., on November 1974. Volume II.
Dec 74, 511p* EPA/650/2-74-126-b
Paper copy also available in set of 2 reports as PB-242 571-SET, PC$26.00.

Descriptors: *Desulfurization, *Sulfur oxides, *Flue gases, *Meetings, Sulfuric acid, Utilization, Solid waste disposal, Materials recovery, Sludge disposal, Scrubbers, Activated carbon treatment, Regeneration(Engineering), Absorbers(Materials), Absorbers(Equipment).
Identifiers: *Air pollution control, Magnesium oxide scrubbing, Wellman process, Cat-Ox process, Ammonia scrubbing, Stone and Webster process, Citrate process.

The proceedings document the presentations made during the symposium, which dealt with the status of flue gas desulfurization technology, both in the U.S. and abroad. The presentations emphasize process costs, both regenerable and non-regenerable processes second generation processes, and byproduct disposal/utilization. Aim of the symposium was to provide potential users of sulfur oxide control technology with a current review of progress made in applying processes for the reduction of sulfur oxide emissions at the full- or semi-commerical scale. Volume 2 covers regenerable processes, desulfurization byproduct disposal and utilization, and second generation processes.

PB-242 595/7GA PC$7.25/MF$2.25
Fluor Engineers and Constructors, Inc., Los Angeles, Calif.
Economics of Air vs. O2 Pressure Gasification of Coal.
Rept. on Phase I.
Jan 75, 204p* EPRI-239-1-I

Descriptors: *Coal gasification, Fluidized bed processing, Fluidized bed combustion, Moving burden process, Entrainment, Gas fuels, Combined cycles, Power plants, Electric power, Process charting, Cost estimates, Capitalized costs, Operating costs, Air, Oxygen.

Directional economic trends for the alternative use of air or oxygen in coal gasification processes are studied. The processes evaluated are: moving bed, fluidized bed, and entrained bed gasification to produce clean fuel gas. In addition, entrained bed coal gasification is studied in conjunction with a combined cycle power plant.

PB-242 774/8GA PC$6.25/MF$2.25
Beychok (Milton R.), Irvine, Calif.
Process and Environmental Technology for Producing SNG and Liquid Fuels.
Environmental protection technology series,
Milton R. Beychok. Mar 75, 152p* EPA/660/2-75-011
Contract EPA-68-03-2136
Paper copy also available from GPO as SN-055-001-01017.

Descriptors: *Synthesis gas, *Synthetic fuels, *Energy conversion, *Environmental impacts, Liquid fuels, Liquefied petroleum gases, Naphtha, Coal gasification, Liquefied natural gas, Petroleum industry, Gas industry, Industrial wastes, Thermal efficiency, Coal liquefaction, Shale oil, Oil shale, Gas pipelines, Cost estimates, Flue gases, Heat balance, Crude oil, Air pollution, Water pollution, Water balance, Methyl alcohol.
Identifiers: Lurgi process, *Technology assessment.

This report presents the process technology and environmental factors involved in the emerging industries for providing new supplemental energy supplies from non-conventional sources. It includes: (1) the production of substitute natural gas (SNG) from coal, crude oil and naphtha, (2) importing overseas gas supplies in the form of liquefied natural gas (LNG) and as liquid methanol, (3) the regasification of LNG, (4) the production of liquid fuels from oil shale, and (5) the liquefaction of coal to produce clean fuels. The report also includes introductory chapters to familiarize the reader with the technology of oil and gas processing, heat balances, fuel combustion and stack gases, thermal efficiencies, and water balances.

7B. Inorganic Chemistry

AD-A011 161/7GA PC$3.25/MF$2.25
Harvard Univ Cambridge Mass Dept of Chemistry
Energy of Formation of B2H6 from 2BH3 Near the Hartree-Fock Limit.
Technical rept.,
Dennis S. Marynick, John H. Hall, Jr., and William N. Lipscomb. 23 Aug 74, 4p Rept no. TR-75-2
Contract N00014-67-A-0298-0018
Availability: Pub. in the Jnl. of Chemical Physics, v61 n12 p5460-5461, 15 Dec 74.

Descriptors: *Boron hydrides, *Diboranes, Hartree-fock approximation, Heat of formation, Energy, Computations, Reprints.
Identifiers: Energy of formation.

Calculation of the energy of formation of diborane from 2BH3 by self-consistent field methods has yielded discordant results. A value of -19.9 kcal is reported for the reaction from a large Gaussian basis set.

AD-A011 162/5GA PC$3.25/MF$2.25
Harvard Univ Cambridge Mass Dept of Chemistry
Observations Regarding Cu-H-B Interactions in Cu(I)2B10H10.
Technical rept.,
Timm E. Paxson, M. Frederick Hawthorne, Leo D. Brown, and William N. Lipscomb. 16 May 74, 6p Rept nos. TR-75-3, Contrib-3237
Contract N00014-67-A-0298-0018
Availability: Pub. in Inorganic Chemistry, v13 n11 p2772-2774 1974.

Descriptors: *Copper compounds, *Boron hydrides, *Boranes, Complex compounds, Chemical reactions, Interactions, Chemical bonds, Reprints.
Identifiers: Covalent bonds.

In 1962 Dobrott and Lipscomb confirmed the D4d symmetry of the B10H10(2-) anion by an X-ray diffraction study of Cu(I)2B10H10 and the nature of the covalent interactions of the copper atoms with the borane aggregate was discussed in detail. The authors postulated either an sp hybridized Cu(I) forming three-center bonds with B-B edges or a tetrahedrally hybridized Cu(I) interacting with the four nearest B atoms. The latter interpretation was discounted since the B-Cu-B angles were acute. A third interpretation of the covalent bonding, not mentioned by Dobrott and Lipscomb, is the possible involvement of the borane terminal hydrogen atoms with sp(3) hybridized copper orbitals, thus forming three-center Cu-H-B bridge bonds. Enough Cu-H-B interaction exists in Cu(I)2B10H10 to affect its ir spectrum substantially. There are both Cu-B and Cu-H-B interactions in the complexes of Cu(I) with the boron hydride anions BH4(-), B3H8(-), and B10H10(-). The Cu-H distances of 1.8-2.1 A probably indicate less than full bridge bonds, even though the bonding they do show modifies their infrared spectra as compared with that of terminal B-H units.

AD-A011 200/3GA PC$3.25/MF$2.25
North Carolina Univ Chapel Hill
Electron Transfer Quenching of the Luminescent Excited State of Tris(2,2'-Bipyridine)Ruthenium (II). A Flash Photolysis Relaxation Technique for Measuring the Rates of Very Rapid Electron Transfer Reactions.
C. R. Bock, T. J. Meyer, and D. G. Whitten. 12 Mar 74, 5p ARO-8168.11-C
Grant DA-ARO-D-31-124-G1097
Availability: Pub in Jnl. of the American Chemical Society, 96 p4710-4712 1974.

Descriptors: *Ruthenium compounds, *Metalorganic compounds, *Complex compounds, *Photolysis, Electron transfer, Quenching(Inhibition), Excitation, Reprints.

Quenching processes involving the luminescent excited states of tris(2,2'-bipyridine)ruthenium(II), and related metal complexes are of considerable current interest.

N75-22405/5GA PC$4.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Reactions of Carbon Dioxide with Silicates under High Pressures.
W. Weyl. Apr 75, 51p NASA-TT-F-16271
Contract NASW-2481
Tran-Transl. Into English from Glastech. Ber. (Frankfurt AM Main), V. 9, No. 12, Dec. 1931.

Descriptors: *Carbon dioxide, *Chemical reactions, *High pressure, *Silicates, Calcium silicates, Lithium compounds, Melting, Potassium silicates, Pressure chambers, Sodium silicates.

For abstract, see STAR 1314

N75-22406/3GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
High Temperature Chemical Kinetic Study of the H2-CO-CO2-No Reaction System.
C. J. Jachimowski. May 75, 18p NASA-TN-D-7897, L-9994

Descriptors: *Combustion products, *High temperature research, *Nitric oxide, *Reaction kinetics, Coefficients, Graphs (Charts), Heat of dissociation, Shock heating, Shock waves.

For abstract, see STAR 1314

PB-242 130/3GA PC$3.75/MF$2.25
California Univ., Los Angeles. School of Engineering and Applied Science.
Studies Pertaining to Hydrogen Car Development. Part A. The Kinetics and Mechanism of Magnesium Alloy-Hydride Formation and Dissociation.
Final rept.,
D. L. Douglass. Oct 74, 42p UCLA-ENG-7489-Pt-A DOT/TST-75-98
Contract DOT-OS-40011
See also Parts B and C, PB-242 131.

Descriptors: *Hydrogen, *Magnesium hydrides, *Automotive fuels, *Fuel storage, *Hydrides, Diffusion, Crystal growth, Reaction kinetics, Nickel inorganic compounds, Phase studies, Magnesium alloys, Aluminum containing alloys, Nickel containing alloys.
Identifiers: Magnesium nickel hydrides, Magnesium alloy 10Al, Magnesium alloy 25Ni, DOT/4EZ/EA, DOT/4DZ/DB.

The reaction between high-pressure hydrogen and Mg-10Al to form MgH2 in the range of 400 to 450 degrees C was found to be a diffusion-controlled process. Initially hydrogen dissolved rapidly into the metal particles, and MgH2 generally nucleated homogeneously as spherical particles. Growth of the particles was controlled by hydrogen diffusion in the metal and the kinetics followed the Johnson-Mehl relationship. The particles were readily hydrided to 7 w/o hydrogen and were found to exhibit very little fragmentation. Dehydriding followed the same rate law and was found to be complete in 90 minutes at 300 degrees C, these conditions being favorable for the use of this hydride in vehicles combusting hydrogen. The reaction involving Mg-25Ni resulted in two hydrides, MgH2 and Mg2NiH4, the former being more stable and forming first.

7C. Organic Chemistry

AD-A011 160/9GA PC$3.25/MF$2.25
Harvard Univ Cambridge Mass Dept of Chemistry
Computational Evidence for a Stable Intermediate in the Rearrangement of 1,2-C2B4H6 to 1,6-C2B4H6.
Technical rept.,
Thomas A. Halgren, Irene M. Pepperberg, and William N. Lipscomb. 19 Oct 74, 6p Rept no. TR-75-1
Contract N00014-67-A-0298-0018, Grant PHS-GM-0692C
Availability: Pub. in Jnl. of the American Chemical Society, v97 n5 p1248-1250, 5 Mar 75.

Descriptors: *Carboranes, *Chemical reactions, *Isomeric transitions, Boron compounds, Stability, Reprints.
Identifiers: Rearrangement, Internal rearrangement.

Few reaction pathways in rearrangements of boron compounds are mechanistically well understood. The isomerization of 1,2-C2B4H6 to 1,6-C2B4H6 is a polyhedral rearrangement for which the cooperative twist dsd (diamond-square-diamond) mechanism has been suggested. This interconversion proceeds measurably at 250 deg, but a CNDO/2 study failed to find an energetically accessible pathway. Reported here is a PRDDO study of this interconversion and of the analogous degenerate rearrangement of B6H6(2-) which utilizes and serves to introduce a new approach for computing reaction pathways. A principal result is a subtle but energetically significant modification of the dsd mechanism which implicates a third stable geometry on the C2B4H6 energy surface as an intermediate in the interconversion. A second focus is the effect -- and predictability -- of carbon substitution on the energetics of the parent B6H6(2-) rearrangement.

AD-A011 201/1GA PC$3.25/MF$2.25
Duke Univ Durham N C Dept of Physics
Free Radicals Formed by Exposure of Pyrimidine Solids to Sodium atoms: An Electron Spin Resonance Study,
G. Allan Johnson, and Walter Gordy. 23 Dec 74, 7p ARO-11803.8-P
Grant DAHC04-74-G-0034
Availability: Pub in Proceedings of the National Academy of Sciences of the United States of America, v72 n3 p974-978 Mar 75.

Descriptors: *Pyrimidines, *Electron paramagnetic resonance, *Free radicals, Electrons, Sodium, Atoms, Complex compounds, Solids, Reprints.
Identifiers: Electron spin resonance, Charge transfer.

Sodium atoms have been deposited on various pyrimidine powders under high vacuum at 77 K and the electron spin resonance spectra of the resulting free radicals have been observed. Generally, the spectra show that the electron of the Na goes into a molecular orbital of the pyrimidine ring and the Na(+) ions become attached to a carbonyl oxygen of the resulting pyrimidine anion. In 5-fluorouracil and 5-chlorouracil, however, the halogen is evidently abstracted by the Na to form NaF or NaCl and the neutral uracil radical. Thymine shows evidence for H-addition radicals as well as the Na(+) (thymine) complex. The H source for the addition radicals may be an H2O impurity in the sample, with which the Na atoms combine to release the H atoms. In addition to a resonance with g = 2.00 from the pyrimidine anion radical, broad resonances with g greater than 2 were observed for 5-bromouracil, 5-chlorouracil and 5-iodouracil, as well as for alloxan and cytosine. These resonances, generally unstable at room temperature, are eblieved to arise from electrons trapped in interstitial sites or vacancies in the lattice. (Author)

AD-A011 305/0GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
MINDO/3 Study of (18)Annulene,
Michael J. S. Dewar, R. C. Haddon, and P. J. Student. 30 Apr 74, 4p AFOSR-TR-75-0775
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the Chemical Society Chemical Communications, p569-570 1974.

Descriptors: *Cyclic compounds, Molecular orbitals, Geometry, Chemical bonds, Length, Heat of formation, Computerized simulation, Molecular structure, Reprints.
Identifiers: *Annulene, MINDO/3.

The geometry of (18)annulene has been calculated by minimising the energy with respect to all 102 internal co-ordinates, using the MINDO/2 and MINDO/3 semiempirical SCF MO methods; the bond lengths are predicted to alternate, in agreement with calculations by the pi approximation and molecular mechanics and the predicted heat of formation agrees with that from the pi approximation, implying little aromatic stabilization. (Author)

AD-A011 315/9GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
The Stevens Rearrangement: An Antiaromatic Pericyclic Reaction,
Michael J. S. Dewar, and Christopher A. Ramsden. 7 Aug 73, 10p AFOSR-TR-75-0778
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the Chemical Society, Perkin Transactions I, p1839-1844 1974.

Descriptors: *Exothermic reactions, *Aromatic compounds, Activation energy, Electrostatics, Chemical bonds, Reprints.
Identifiers: MINDO/3 method, *Stevens rearrangement, *Rearrangement reactions, Pericyclic reactions, Woodard-Hoffman rules.

The possibility that the Woodward-Hoffmann rules may break down quite generally for very exothermic reactions is discussed. MINDO/3 Calculations for a pericyclic mechanism for the Stevens rearrangement support this possibility. Although a concerted mechanism for the Stevens rearrangement is formally 'forbidden' according to the Woodward-Hoffman rules, the calculated activation energy is extremely small (17 kJ/mol). The calculated structure of a benzoyl-stabilized nitrogen ylide is reported, and the electrostatic energy of the ylide is estimated. (Author)

AD-A011 521/2GA PC$3.25/MF$2.25
Georgia Univ Athens Dept of Chemistry
Isocyanide-Metal Complexes. II. CO and CN Stretching Modes in tert-Butyl Isocyanide Derivatives of the Octahedral Metal Carbonyls,
R. B. King, and Mohan Singh Saran. 17 May 73, 8p AFOSR-TR-75-0846
Grant AF-AFOSR-2000-71
See also AD-770 668.
Availability: Pub. in Inorganic Chemistry, v13 n1 p74-78 1974.

Descriptors: *Nitriles, *Complex compounds, *Carbonyl compounds, *Metalorganic compounds, Chromium compounds, Molybdenum compounds, Tungsten compounds, Infrared spectroscopy, Reprints.
Identifiers: Isocyanides.

AD-A011 522/0GA PC$3.25/MF$2.25
Georgia Univ Athens Dept of Chemistry
Organometallic Chemistry of the Transition Metals. XXIX. Redox Systems in Hexamethylbenzene Cluster Compounds of Niobium and Tantalum,
R. B. King, D. M. Braitsch, and Pramesh N. Kapoor. 16 Jul 74, 7p AFOSR-TR-75-0847
Grant AF-AFOSR-2000-71
See also AD-667 508.

Availability: Pub. in Jnl. of the American Chemical Society, v97 n1 p60-64 Jan 75.

Descriptors: *Benzene compounds, *Niobium compounds, *Tantalum compounds, *Metalorganic compounds, Methyl radicals, Complex compounds, Transition metals, Electrochemistry, Oxidation reduction reactions, Reprints.
Identifiers: Benzene/Hexamethyl.

AD-A011 597/2GA PC$10.00/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Analytical Methodology for Herbicide Orange. Volume I: Determination of Chemical Composition.
Final rept. Dec 72-Dec 74,
B. M. Hughes, D. C. Fee, M. L. Taylor, T. O. Tiernan, and C. E. Hill, Jr. May 75, 363p Rept no. ARL-75-0110-Vol-1
See also Volume 2, AD-A011 598.

Descriptors: *Herbicides, *Chromatographic analysis, *Mass spectroscopy, Oxygen heterocyclic compounds, Gas chromatography, Chemical composition, Chemical analysis, Experimental data, Column chromatography, Mass spectra.
Identifiers: *Orange herbicide, D-2-4 herbicide, T-2-4-5 herbicide, Dibenzo-p-dioxin/tetrachloro.

This report describes research performed by ARL at the request of the Air Force Logistics Command to develop and apply analytical methodology to characterize the USAF inventory of Herbicide Orange stocks. A computerized Gas Chromatograph-Mass Spectrometer (GC-MS) system was developed which permitted determination of the 15 to 25 major and minor herbicide components which are typically present in the stocks located at Gulport, Mississippi. For determination of tetrachlorodibenzo-p-dioxin (TCDD), a fully automated GC-Quadrupole MS was developed and used in conjunction with an improved column-chromatography sample-clean-up technique. The analytical methodology is described in detail. Experimental data are included.

AD-A011 598/0GA PC$3.75/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Analytical Methodology for Herbicide Orange. Volume II: Determination of Origin of USAF Stocks.
Final rept. Dec 72-Dec 74,
D. C. Fee, B. M. Hughes, M. L. Taylor, T. O. Tiernan, and C. E. Hill, Jr. May 75, 39p Rept no. ARL-75-0110-Vol-2
See also Volume 1, AD-A011 597.

Descriptors: *Herbicides, *Gas chromatography, Impurities, Chemical composition, Experimental data, Chemical analysis.
Identifiers: *Orange herbicide, D-2-4 herbicide, T-2-4-5 herbicide.

A method was developed for gas-chromatographic characterization of chlorophenoxy herbicide formulations; with this method the original manufacturer of the herbicide could be determined. Using a temperature-programmed flame-ionization gas chromatograph, a gas chromatogram was obtained for each of several herbicide specimens. It was found that the amount and type of impurities determined gas chromatographically are characteristic of the original manufacturer of the material. In addition, this simple analytical method was used to determine the homogeneity of the USAF herbicide stocks. These data were used to prepare Environmental Impact Statements for the Environmental Protection Agency.

AD-A011 635/0GA PC$3.25/MF$2.25
University of Southern California Los Angeles Dept of Chemistry
Pyrolysis of 1-Phenyl-1,3-Butadienes. A New Synthesis of 1,2-Dihydronaphthalenes,
William P. Weber, Phillip B. Valkovich, James L. Conger, Frank A. Castiello, and Todd D. Brodie. 17 Sep 74, 3p AFOSR-TR-75-0688
Grant AF-AFOSR-2424-73
Availability: Pub. in Jnl. of the American Chemical Society, v97 p901-902 1975.

Descriptors: *Pyrolysis, *Synthesis(Chemistry), *Butadienes, *Naphthalenes, Phenyl radicals, Aryl radicals, Reprints.
Identifiers: Dihydronaphthalenes, Phenylbutadienes.

A new general synthesis of 1,2-dihydronapthalenes from readily available 1-aryl-1,3-butadienes is reported. (Author)

AD-A011 636/8GA PC$3.25/MF$2.25
University of Southern California Los Angeles Dept of Chemistry
Pyrolytic and Photochemical Fragmentation of 1,1-Dimethyl-2-Phenyl-1-Silacyclobutane,
William P. Weber, Phillip B. Valkovich, and Thomas Isami Ito. 20 Jun 74, 5p AFOSR-TR-75-0687
Grant AF-AFOSR-2424-73
Availability: Pub. in Jnl. of Organic Chemistry, v39 n24 p3543-3546 1974.

Descriptors: *Cyclobutanes, *Pyrolysis, *Photochemical reactions, *Fragmentation, *Synthesis(Chemistry), Methyl radicals, Phenyl radicals, Silanes, Photolysis, Carbinols, Reprints.

An efficient synthesis of 1,1-dimethyl-2-1-1-silacyclobutane (1) is reported. Gas-phase pyrolysis of 1 at 500 deg yields cis- and trans-1,1,3,3-tetramethyl-2,4-diphenyl-1,3-disilacyclobutane. The mass spectrum of 1 is discussed. Photolysis of 1 in methanol yields 3-phenylpropyldimethylmethoxysilane. (Author)

AD-A011 637/6GA PC$3.25/MF$2.25
University of Southern California Los Angeles Dept of Chemistry
A Convenient Synthesis of 1,2-Dimethyltetramethoxydisilane,
William P. Weber, and Michael E. Childs. 9 Sep 74, 6p AFOSR-TR-75-0689
Grant AF-AFOSR-2424-73
Availability: Pub. in Jnl. of Organometallic Chemistry, v86 p169-173 1975.

Descriptors: *Silanes, *Synthesis(Chemistry), *Photolysis, Methyl radicals, Metalorganic compounds, Mass spectra, Reprints.
Identifiers: Disilane/1-2-dimethyltetramethoxy.

Photolysis of methyldimethoxysilane in the gas phase yields 1,2-dimethyltetrametoxydisilane. The mass spectrum of 1,2-dimethyltetramethoxydisilane is discussed. 1,2-dimethyltetramethoxydisilane is know th be an excellent precursor to methylmethoxydisilylene. (Author)

AD-A011 638/4GA PC$3.25/MF$2.25
University of Southern California Los Angeles Dept of Chemistry
Copyrolysis of 1,1-Dimethyl-2-Phenyl-1-Silacyclobutane and Acrolein,
William P. Weber, and Phillip B. Valkovich. 12 Jul 74, 4p AFOSR-TR-75-0690
Grant AF-AFOSR-2424-73
Availability: Pub. in Jnl. of Organic Chemistry, v40 n2 p229-230 1975.

Descriptors: *Acroleins, *Cyclobutanes, *Pyrolysis, Silanes, Phenyl radicals, Methyl radiccls, Addition reactions, Double bonds, Gases, Reprints.
Identifiers: *Copyrolysis.

Copyrolysis at 500 deg in the gas phase of 1,1-dimethyl-2-phenyl-1-silacyclobutane and acrolein yields hexamethylcyclotrisiloxane, octomethylcyclotetrasiloxane, 1,2-dihydronaphthalene, naphthalene, and 1,1-dimethyl-1-sila-2-oxa-6-phenyl-3-cyclohexene. 1,2-Dihydronaphthalene was shown to be formed from trans-1-phenyl-1,3-butadiene under the reaction conditions. Formation of these products can be accounted for in terms of competing (2+2) and (2+4) cycloaddition reactions between acrolein and a reaction intermediate ((CH3)2Si=HC6H5) possessing a carbon-silicon double bond. (Author)

COM-75-50352/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Vinyl Chloride Detection Using Carbon Monoxide and Carbon Dioxide Infrared Lasers.
Final rept.,
Samuel M. Freund, and Daniel M. Sweger. May 75, 3p
Pub. in Analytical Chemistry, v47 n6 p930-932 May 75.

Descriptors: *Vinyl chloride, *Gas analysis, *Spectroscopic analysis, Carbon dioxide lasers.
Identifiers: Laser spectroscopy, Carbon monoxide lasers, Air pollution detection, Reprints.

Stark modulated absorption of CO and CO2 infrared laser radiation by vinyl chloride is the basis for sensitive and selective detection of this gas. Using the P (13) line of the 20-19 band of the CO laser (1609/cm), a 2 ppm C2H3Cl in air sample is observed in an extracavity absorption cell with a 5/I signal-to-noise ratio after 50 seconds of integration. The response of the signal to concentration of C2H3Cl is linear over at least 3 orders of magnitude to within experimental uncertainty which is a few percent. Similar results are obtained using a CO2 laser operating on the P(42) line of the 001-100 band (922.9/cm).

COM-75-50375/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Reactions des Ions Moleculaires Cyclohexane en Phase Gazeuse. (Molecular Ion Reactions of Cyclohexane in the Gas Phase).
Final rept.,
Guy J. Collin, and Pierre Ausloos. 1975, 8p
Text in French.
Pub. in Canadian Jnl. of Chemistry, v53 n5 p680-687 1975.

Descriptors: *Cyclohexane, *Chemical reactions, Aliphatic hydrocarbons, Charge transfer, Exchange reactions, Molecular structure.
Identifiers: Ion molecule interactions, Reprints.

The cy-C6H12+ ions formed in the photoionization of cyclohexane (resonance lines of argon: 11.6-11.8 eV) react with cyclic (C3 and C4) and unsaturated hydrocarbons by H2 transfer. This reaction is quantitative with propene, 1-butene, 1/pentene, 1,3-butadiene, and isobutene. This transfer is efficient only if there is a terminal double bond. There is ring opening with the C3 and C4 hydrocarbons. H atom transfer reactions are also observed between cy-C6H12+ ions and several compounds and the structure of the radical formed in such a reaction is determined by chemical analysis. With cis-2-butene, there is only charge transfer reaction.

N75-23257/9GA PC$3.75/MF$2.25
Interuniversitair Reactor Instituut, Delft (Netherlands).
Reaction of Charged Species in Irradiated Cyclohexane with Added Solutes as Studied by Steady State Radiolysis. Relative Rate

Constants for Reaction of the Positive and the Negative Species with Different Solutes.
E. L. Davids, J. M. Warman, and A. Hummel.
1974, 40p IRI-133-73-13
Subm-Submitted for Publication.

Descriptors: *Charged particles, *Irradiation, *Organic compounds, *Scavenging, Diffusion coefficient, Ion recombination, Radiolysis, Rates (Per time), Yield.

For abstract, see STAR 1314

PAT-APPL-563 007/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Preparation of Polybenzimidazoles.
Patent Application,
Fred E. Arnold. Filed 27 Mar 75, 17p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Heat resistant plastics, Amines, Benzimidazoles, Synthesis(Chemistry), Polymerization, Patents, Nitrogen heterocyclic compounds.
Identifiers: *Polybenzimidazoles, Aryl acids, *Patent applications, PAT-CL-260-556, Sulfonamides.

The patent application describes a process for preparing polybenzimidazoles in which aromatic bis-orthoaminosulfonamides and aromatic dicarboxylic acids or derivatives thereof are polymerized in polyphosphoric acid. The process provides thermally stable heterocyclic polymers of very high molecular weight that are especially useful in forming films and fibers.

PAT-APPL-563 466/GA PC$4.25/MF$2.25
Department of Health, Education, and Welfare, Washington, D.C.
Method of Making Pteridine Compounds.
Patent Application,
James R. Piper, and John A. Montgomery. Filed 31 Mar 75, 56p DHEW-K-54-75
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Patent applications, *Pteridines, *Methotrexate, *Aminopterin, Synthesis(Chemistry), Antineoplastic agents, Phosphines, Substitution reactions, Bromine organic compounds, Alpha amino carboxylic acids.

A method for the preparation of pteridine compounds such as methotrexate is disclosed. 2,4-diamino-6-pteridine-methanol-HBr is reacted with triphenylphosphine dibromide or phosphorus tribromide to form 6-(bromomethyl)-2,4-diamino-pteridine hydrobromide and the bromine atom in the molecule is then replaced with the functional group, N-(4-(methylamino)-benzoyl)-L-glutamic acid in the case of methotrexate and N-(4-aminobenzoyl)-L-glutamic acid in the case of aminopterin.

PATENT-3 874 957 Not available NTIS
Department of the Air Force Washington D C
Use of 1,1'-bis-(1-Glycidoxylalkyl) Ferrocenes in Rocket Propellants.
Patent,
Robert C. Corley, and Fred M. Dewey. Filed 7 Apr 70, patented 1 Apr 75, 8p Rept nos. PAT-APPL-31 041,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Ferrocenes, *Patents, *Solid rocket propellant binders, Curing agents, Synthesis(Chemistry), Plasticizers, Catalysts, Molecular structure, Epoxy compounds.
Identifiers: PAT-CL-149-5.

The patent concerns the use of 1,1'-bis-(1-glycidoxylalkyl) ferrocenes in rocket propellants. 1,1'-Bis(1,glycidoxyalkyl)ferrocenes are new compounds prepared by (a) reacting an acyl halide with ferrocene to form a 1,1'-bis(acyl)ferrocene, (b) reducing the 1.1'-bis(acyl)ferrocene to a 1,1'-bis(1-hydroxyalkyl)ferrocene with a reducing agent, (c) reacting the 1,1'-bis(1-hydroxyalkyl)ferrocene with an alkali metal alkyl to form the alkali metal salt, and (d) reacting the alkali metal salt with an epihalohydrin to form the final product. The 1,1'-bis(1-glycidoxyalkyl)-ferrocenes are useful as curing agents for solid rocket propellant binders, as plasticizers for solid rocket propellants, and as burn rate catalysts.

PATENT-3 876 614 Not available NTIS
Department of the Air Force Washington D C
Thermally Stable, Highly Fused Quinoxaline Composition and Method of Synthesis.
Patent,
Frederick Hedberg, and Fred E. Arnold. Filed 17 Apr 74, patented 8 Apr 75, 9p Rept nos. PAT-APPL-461 689,
Supersedes AD-164 758.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Heat resistant plastics, Condensation reactions, Synthesis(Chemistry), Molecular structure, Curing.
Identifiers: *Polyquinoxalines, Cyclization, Rearrangement reactions, PAT-CL-260-47-UA.

The patent concerns the synthesis of quinoxaline polymers by solution polycondensation of 2,2'-bis(phenylethynyl)-5,5'-diaminobenzidine with aromatic bis-benzils. Upon heating the polymers so prepared at a temperature ranging from about 240 to 300C, they undergo a thermal intramolecular cyclization reaction, thereby providing cured, thermally stable, highly fused quinoxaline compositions. Because of their solubility in aprotic solvents and the mechanism whereby they are cured, the quinoxaline polymer are particularly suitable for use in high temperature applications such as in the fabrication of plastic composites and protective coatings.

7D. Physical Chemistry

AD-A011 242/5GA PC$3.25/MF$2.25
Army Environmental Hygiene Agency Aberdeen Proving Ground Md
Extraction and Separation of Polychlorinated Biphenyls from Pesticide Monitoring Samples.
Entomological special study,
Jack M. Heller. 15 Apr 75, 10p Rept no.
USAEHA-44-042-74/75

Descriptors: *Column chromatography, *Chromatography, Chlorine compounds, Body fluids, Tissues(Biology), Extraction, Separation, Pesticides, Test methods.
Identifiers: *Biphenyl/chloro, *Chlorine aromatic compounds, Evaluation.

A new method was tested for the removal of polychlorinated biphenyls (PCB's) from biological samples. These industrial chemicals are ubiquitous in biological samples such as fish and bird adipose tissue. Based on retention characteristics they can easily be misidentified as organochlorine pesticides. The PCB's are partially or completely recovered from a Florisil column using the multiresidue methodology for organochlorine pesticides. A silic acid column was spiked with a solution of 4 PCB's and 11 insecticides. Performance of the method was judged by percent recovery of pesticides along with their complete separation from the PCB's and p,p-DDE. The method performed well with respect to the above-mentioned criteria.

AD-A011 290/4GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
An Acoustical Technique for Measuring the Temperature of Maximum Density of Dilute Aqueous Solutions.
Medical research progress rept.,
Kenneth R. Foster, and Edward D. Finch. 12 Jul 74, 4p
Availability: Pub. in the Jnl. of Physical Chemistry, v78 n22 p2305-2306 1974.

Descriptors: *Solutions(General), *Temperature measuring instruments, Density, Test methods, Acoustic equipment, Water, Acoustics, Sodium chloride, Thermal expansion, Reprints.

The temperature of maximum density, the TMD, is a thermodynamic parameter of an aqueous solution which is unusually sensitive to solute-induced modifications in the structure of water. It was observed that sound transients produced in aqueous solutions by pulses of microwave energy can be used to measure this parameter rapidly and accurately. These sound transients result directly from thermal expansion of the heated regions of fluid; they have an amplitude proportional to the thermal expansion coefficient, alpha, and they vanish at the TMD.

AD-A011 291/2GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Time-Resolved Fourier Spectroscopy,
Randall E. Murphy, Floyd H. Cook , and Hajime Sakai. 29 Nov 74, 6p Rept no. AFCRL-TR-75-0340
Availability: Pub. in Jnl. of the Optical Society of America, v65 n5 p600-604 May 75.

Descriptors: *Fourier spectrometers, *Time, Variations, Interferograms, Oxygen, Nitrogen, Gases, Mixtures, Reprints.
Identifiers: *Fourier spectroscopy.

Fourier spectroscopy has enjoyed considerable success in the measurement of sources that are stationary with respect to time. A technique for the study of time-varying spectral features, by use of Fourier spectroscopy, is presented. With this technique, the multiplex advantage is retained and the available measurement time is utilized efficiently. The technique consists of obtaining a series of interferograms, separated sequentially in time, according to the time-resolution capability of the detection system. The interferogram signal is recorded over a time interval, delta t, corresponding to a particular time t sub j, in the evolution of the source. The entire series of interferograms is obtained in a single scan of a Michelson interferometer. The S/N may be improved by continued exposure at the same optical path difference, corresponding to the same t sub j in the evolution source. The time-sequenced interferograms are transformed to obtain the recovered spectra at successive time intervals. As a demonstration of the technique, the spectral evolution of a N2/O2, gas mixture subjected to high-energy-electron irradiation is given in 50 micro s intervals.

AD-A011 304/3GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
The Cornforth Rearrangement,
Michael J. S. Dewar, and Ignatius J. Turchi. 12 Mar 74, 8p AFOSR-TR-75-0777
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the American Chemical Society, v96 n19 p6148-6152, 18 Sep 74.

Descriptors: *Amides, *Reaction kinetics, *Oxygen heterocyclic compounds, *Azoles, Carboxylic acids, Reprints.
Identifiers: Rearrangement reactions, Cornforth rearrangement.

The rates of Cornforth rearrangements of 2-aryl-5- methoxyoxazole-4-carboxylic amides

have been studied. Variation of substituents in the 2nphenyl group indicates that a small positive charge develops at the adjacent carbon on passing to the transition state. Similar variation of substituents in a phenyl group attached to the amide nitrogen indicates that a similar small negative charge develops in the amide moiety. The effect of changes in the solvent also indicates that the transition state is not strongly polar. Either the transition state must occur early in the reaction or the open chain intermediate must be less polar than a classical zwitterionic structure would suggest. (Author)

AD-A011 309/2GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Orbital Isomerism in Biradical Processes,
Michael J. S. Dewar, Steven Kirschner, Herbert W. Kollmar, and Leslie E. Wade. 1 Dec 73, 4p AFOSR-TR-75-0773
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the American Chemical Society, v96 p5242-5244 1974.

Descriptors: *Molecular orbitals, *Molecular isomerism, Organic compounds, Interactions, Reprints.
Identifiers: *Biradicals, Jahn-Teller effect.

Singlet biradicals (i.e. species with HOMO/LUMO degeneracy) undergo Jahn-Teller distortion to pairs of isomeric lumomers whose interconversion involves a HOMO/LUMO crossing and is therefore 'Forbidden'. In certain cases the Jahn-Teller isomers differ little from the intermediate biradical; several reactions are interpreted in terms of the 'forbidden' interconversion of such pairs of biradicaloids. (Author)

AD-A011 381/1GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Additivity of Bond Energies in the Light of the Maximum Overlap Approximation (MOA) and MINDO/3,
Michael J. S. Dewar, Donald H. Lo, and Zvonimir B. Maksic. 19 Nov 74, 8p AFOSR-TR-75-0760
Contract F44620-71-C-0119
Summary in Croatian.
Availability: Pub. in Croatica Chemica Acta, v46 n1 p7-13 1974.

Descriptors: *Chemical bombs, *Energy, *Molecular orbitals, Heat of reaction, Atomization, Hydrocarbons, Carbon, Atoms, Reprints.
Identifiers: MINDO/3 molecular orbitals, MINDO molecular orbitals, Maximum overlap approximation.

Optimum parameters are determined for the use of the maximum overlap approximation (MOA) to calculate heats of atomization of a varied set of eleven hydrocarbons. The agreement with experiment is generally good. The reasons for this success are discussed in terms of an analysis by energy partitioning of MINDO/3 calculations for the same hydrocarbons. (Author)

AD-A011 384/5GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Study of the Electronic Energy Band Structure of Polyethylene Using MINDO/3,
Michael J. S. Dewar, Sung Ho Suck, and Paul K. Weiner. 11 Jul 74, 3p AFOSR-TR-75-0744
Contract F44620-71-C-0119
Availability: Pub. in Chemical Physics Letters, v29 n2 p220-221, 15 Nov 74.

Descriptors: *Polyethylene, *Energy bands, Molecular orbitals, Electronics, Computations, Crystals, Photoelectrons, Reprints.
Identifiers: MINDO/3 molecular orbitals, MINDO molecular orbitals.

The electronic structure of polyethylene has been calculated using crystal orbital theory and the latest version (MINDO/3) of the MINDO semi-empirical SCF MO method. The results are in better agreement with the observed photoelectron spectrum than those given by an analogous calculation using MINDO/2, which in turn has been shown superior to treatments based on EHT, CNDO, INDO, or ab initio SCF procedures. (Author)

AD-A011 418/1GA PC$4.75/MF$2.25
Sussex Univ Brighton (England)
Experiments on the Formation and Surface States of Adsorbed Helium Films.
Final technical rept. Jan-Dec 74,
D. F. Brewer. Apr 75, 78p ARDG(E)-R/D-2092
Grant DA-ERO-124-74-G-0046
See also AD-780 167.

Descriptors: *Adsorption, Magnetic properties, Films, Phase studies, Porous materials, Glass, Density, Nuclear magnetic resonance, Helium, Cryogenics, Great Britain, Refrigeration systems, Temperature, Superfluidity, Surfaces.
Identifiers: *Helium 3, *Helium 4.

This report describes progress made in the investigation of phases of He3 and He4 adsorbed on Vycor porous glass at low temperatures. The main experimental effort during this second year of the work has been taken up with the exploration of problems associated with the apparatus used for the three main branches of the work, namely (1) density of adsorbed helium, (2) nuclear magnetic resonance properties of He3 and He3 - He4 films, (3) a novel form of Pomeranchuk refrigeration using adsorbed helium. In addition, an extensive consideration of the magnetic properties of monolayer and sub-monolayer films is given, and copies of two conference papers are included.

AD-A011 431/4GA PC$3.75/MF$2.25
Naval Research Lab Washington D C
Surface Chemistry of Ball Bearing Steels I.
Interim rept.,
J. S. Murday, E. G. Shafrin, E. P. Kingsbury, and S. Allen. Apr 75, 35p Rept no. NRL-MR-3047

Descriptors: *Ball bearings, *Surface chemistry, Steel, Surface finishing, Cleaning, Auger electron spectroscopy, Chemical composition, Surface properties.

The lifetime and performance characteristics of ball bearing surfaces and sliding contacts are determined in part by their surface chemistry. This work is in the nature of a survey to identify the important aspects of the various bearing preparation techniques, using newly available analytical tools which are sensitive to the surface layers. Examples of Auger spectroscopic surface analyses will be presented which illustrate the surface compositional changes due to different aspects of specimen preparation: cleaning techniques, specimen handling procedures, and chemical treatment technology.

AD-A011 433/0GA PC$6.25/MF$2.25
Naval Research Lab Washington D C
Review of Surface Physics.
Final rept.,
James S. Murday. May 75, 151p Rept no. NRL-MR-3062

Descriptors: *Reviews, *Surface properties, *Surfaces, Adsorption, Scattering, Atoms, Molecules, Ions, Surface chemistry.
Identifiers: *Gas surface interactions, Surface scattering.

The state of knowledge of physics of the gas-solid interface is reviewed with two goals in mind. The first is to establish what is known, and what impedes further progress in surface physics. The second goal is to establish processes, technologies, and material behavior which depend critically on surface properties. Chapters are entitled: Characterization of a clean surface; Adsorbed atoms and molecules on surfaces; Interactions with surfaces; Technological and material problems dependent on surface properties.

AD-A011 471/0GA PC$3.25/MF$2.25
Universal Energy Systems Inc Medway Ohio
Comparison of Auger Spectra of Mg, Al, and Si Excited by Low-Energy Electron and Low-Energy Argon-Ion Bombardment.
Journal article,
J. T. Grant, M. P. Hooker, R. W. Springer, and T. W. Haas. 14 Aug 74, 6p ARL-75-0128
Contract F33615-74-C-4017
Availability: Pub. in Jnl. of Vacuum Science and Technology, v12 p481-484 Jan/Feb 75.

Descriptors: *Auger electron spectroscopy, *Magnesium, *Aluminum, *Silicon, Ion bombardment, Electrons, Argon, Low energy, Excitation, Sputtering, Reprints.

Auger spectra of Mg, Al, and Si excited by Low-energy electron and argon-ion bombardment have been measured and compared. The Auger spectra obtained under ion bombardment are interpreted as a combination of Auger production in excited sputtered species and bulk atoms. Under argon-ion bombardment at these low energies, L2,3 level ionization occurs in the target through an electron promotion mechanism. No L1 level ionization occurs (to first order). (Author)

AD-A011 473/6GA PC$3.25/MF$2.25
Universal Energy Systems Inc Medway Ohio
Chemical Effects in the M4,5NN Auger Spectrum of Mo(110) Due to Adsorption of O2 and CO.
Journal article,
M. P. Hooker, J. T. Grant, and T. W. Haas. 14 Aug 74, 6p ARL-75-0127
Contract F33615-74-C-4017
Availability: Pub. in Jnl. of Vacuum Science and Technology, v12 n1 p325-328 Jan/Feb 75.

Descriptors: *Molybdenum, *Auger electron spectroscopy, Adsorption, Oxygen, Carbon monoxide, Surfaces, Crystals, Electron transitions, Reprints.

Chemical effects are observed in the M sub 4.5 NN Auger spectrum of Mo following adsorption of oxygen and carbon monoxide on clean MO(110). This system is particularly interesting as Auger transitions involving only core electrons, one conduction band electron or two conduction electrons are all present over the energy range 90-250eV. (Author)

AD-A011 507/1GA PC$3.75/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Reactions of Negative Ions,
T. O. Tiernan. 1973, 34p Rept no. ARL-75-0105
Pub. in Interactions Between Ions and Molecules.

Descriptors: *Anions, *Chemical reactions, *Charge transfer, Gas ionization, Endothermic reactions.
Identifiers: Electron affinity.

As a review of the literature demonstrates, markedly fewer investigations of the reactions of negative ions have been reported than for positive ions. A sampling of recent work is presented, which illustrates some of the many interesting features of negative-ion processes. These processes have important consequences in certain regions of the upper atmosphere. Negative-ion reactions also have broad significance for lasers, discharges, and a variety of

other energetic media. The results to be discussed here will be restricted to the low energy regime (less than 100eV), and will be mainly concerned with bimolecular reactions.

AD-A011 553/5GA PC$3.25/MF$2.25
Sussex Univ Brighton (England) School of Molecular Sciences
CODATA Task Group on Key Values for Thermodynamics, Tentative Set of Key Values for Thermodynamics. Part IV.
Interim rept.,
S. Sunner, J. D. Cox, L. V. Gurvich, and D. D. Wagman. Jan 74, 18p AFOSR-TR-75-0720
Grant AF-AFOSR-2220-72

Descriptors: *Entropy, *Enthalpy, *Heat of formation, Aluminum, Boron, Thermodynamics, Phase, Fluorine, Silicon, Fluorides, Sulfates, Sulfur, Ions, Zinc, Copper, Boron oxides, Hydrogen fluoride, Alumina, Silicon dioxide.
Identifiers: Zinc oxides, Silicon tetrafluoride, Boron trifluoride, *Thermodynamic properties.

The CODATA Task Group on Key Values for Thermodynamics has issued three previous reports containing tentative values for thermodynamic data. The Task Group now offers selected values for 22 more chemical species. Included are the heat of formation, enthalpy, and entropy for F, F(-), F2, HF, S, So4(-2), Si(e), Si(g), SiO2, SiF4(g), B(c), B(g), B2O3, BF3(g), Al(c), Al(g), Al2O3, Zn(+2), ZnO, Cu(c), Cu(g), Cu(+2)(aq).

AD-A011 621/0GA PC$3.25/MF$2.25
Chicago Univ Ill Dept of Chemistry
Laser Spectroscopy of Supersonic Molecular Beams: Application to the Nitrogen Dioxide Spectrum,
R. E. Smalley, B. L. Ramakrishna, D. H. Levy, and L. Wharton. 6 Sep 74, 3p AFOSR-TR-75-0845
Grant AF-AFOSR-2176-72
Availability: Pub. in Jnl. of Chemical Physics, v61 n10 p4363-4364, 15 Nov 74.

Descriptors: *Nitrogen compounds, *Molecular spectroscopy, Lasers, Spectroscopy, Supersonic flow, Molecular beams, Fluorescence, Cooling, Reprints.
Identifiers: *Laser spectroscopy, Nitrogen dioxide.

A supersonic molecular beam technique has been used to collapse the rotational structure of the NO2 electronic absorption spectrum. The spectrum was observed by laser-induced fluorescence; vibronic levels of NO2 are identified by inspection. Additional cooling of the NO2 is achieved by seeding the NO2 (1 to 2%) in an argon carrier gas. (Author)

AD-A011 624/4GA PC$3.25/MF$2.25
Chicago Univ Ill Dept of Chemistry
Method for Increasing the Aperture of Space Focusing Lenses,
Lennard Wharton. 1 Nov 73, 3p AFOSR-TR-75-0844
Grants AF-AFOSR-2176-72, DAHC15-73-G-0018
Availability: Pub. in Review of Scientific Instruments, v45 n6 p825-826 Jun 74.

Descriptors: *Molecular beams, *Lenses, *Focusing, Collimators, Apertures, Electric fields, Reprints.
Identifiers: Space focusing lenses.

There are limitations in the aperture achievable from the use of molecular beam space focusing lenses. It is shown that by a system of lenses in series (or by a lens with a varying strength along its axis) the aperture can be made substantially larger than in the case of a single lens. A method for the design of such a system is given. The use of this method to design a collimator is presented. More powerful lens systems can enhance the sensitivity, signal-to-noise ratio, and resolution of maser beam, molecular beam resonance, and state selecting scattering apparatus that commonly employ these lenses. (Author)

AD-A011 679/8GA PC$3.25/MF$2.25
Toronto Univ (Ontario) Lash Miller Chemical Labs
Dynamics of Collisional Dissociation: I2 in Ar and Xe.
Interim rept.,
W. H. Wong, and G. Burns. 17 Apr 74, 17p
AFOSR-TR-75-0758
Grant AF-AFOSR-2620-74
Pub. in Proceedings of Royal Society London A, v31 p105-119 1974.

Descriptors: *Iodine, *Dissociation, *Particle collisions, Argon, Xenon, Canada, Cross sections.
Identifiers: Atom molecule interactions, Collisional energy transfer.

The dynamics of collision induced dissociation of I2 in Xe and Ar was investigated between 300 and 3500 K by means of 3-D classical trajectory technique. For this purpose stratified and importance sampling techniques were adopted to trajectory studies of dissociation. The dissociation cross-sections for I2-Ar reaction were computed between 1000 and 3500 K as a function of impact parameter and I2 internal energy. It was found that for this reaction the overwhelming contribution to the overall rate coefficient comes from trajectories which involve I2 molecules with initial internal energy + or - 1 kT within the dissociation limit. For I2-Xe reaction at 300 K the 'collisional release' mechanism contributes to dissociation and the 'reactive' I2 have a broader energy range between -4 kT to + 1 kT within the dissociation limit. Highly excited metastable I2 dissociate predominantly by de-excitation collisions in which the total as well as the rotational energy of the reactant molecule is decreased.

COM-75-10739/1GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Analytical Chemistry Div.
Real-Time Acquisition and Processing of Fluorimetry Data.
Technical note,
Peter S. Shoenfeld. Jun 75, 50p NBS-TN-857
Library of Congress Catalog Card no. 74-600202.
Paper copy also available from GPO as C13.46:857.

Descriptors: *Data processing, *Spectroscopic analysis, *Fluoroscence, Computer programming, Emission spectra, Data acquisition.
Identifiers: *Fluorometric analysis.

The National Bureau of Standards Analytical Chemistry Division uses a centralized computer system to automate a number of experiments. Computer software for a fluorimetry application is described in this report. The file and program structure used is quite general and can be applied to other experiments as well.

COM-75-10755/7GA PC$10.50/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Basic Standards.
Tables of Spectral-Line Intensities. Part I. Arranged by Elements. Second Edition,
William F. Meggers, Charles H. Corliss, and Bourdon F. Scribner. May 75, 404p* NBS-MN-145-Pt-1
Library of Congress Catalog Card no. 74-16256.
Paper copy also available from GPO as C13.44:145/I. Supersedes rept. no. NBS-Mono-32-Pt-1, COM-73-11931. See also Part 2, COM-75-10756.

Descriptors: *Spectral lines, *Atomic spectra, *Metals, Intensity, Spectrochemical analysis, Emission spectra, Tables(Data), Radiance.

The relative intensities or radiant powers, of 39,000 spectral lines with wavelengths between 2000 and 9000 Angstroms have been determined on a uniform energy scale for seventy chemical elements. This was done by mixing 0.1 atomic percent of each element in powdered copper, pressing the powder-mixture to form solid electrodes which were burned in a 10 ampere, 220 volt direct-current arc, and photographing the spectra with a stigmatic concave grating while a step sector was rotating in front of the slit. The sectored spectrograms facilitated the estimation of intensities of all element lines relative to copper lines which were then calibrated on an energy scale provided by standardized lamps, and all estimated line intensities were finally adjusted to fit this calibration. Comparisons with other intensity measurements in individual spectra indicate that the National Bureau of Standards spectral-line intensities may have average errors of 20 percent, but first of all they provide uniform quantitative values for the seventy chemical elements commonly determined by spectrochemists. These data are presented by element in part I.

COM-75-10756/5GA PC$7.50/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Basic Standards.
Tables of Spectral-Line Intensities. Part II. Arranged by Wavelengths. Second Edition,
William F. Meggers, Charles H. Corliss, and Bourdon F. Scribner. May 75, 228p* NBS-MN-145-Pt-2
Library of Congress Catalog Card no. 74-16256.
Paper copy also available from GPO as C13.44:145/II. Supersedes rept. no. NBS-Mono-32-Pt-2, COM-73-11932. See also Part 1, COM-75-10755.

Descriptors: *Spectral lines, *Atomic spectra, Metals, Emission spectra, Tables(Data), Spectrochemical analysis, Wavelengths, Radiance, Intensity.

The relative intensities or radiant powers, of 39,000 spectral lines with wavelengths between 2000 and 9000 Angstroms have been determined on a uniform energy scale for seventy chemical elements. This was done by mixing 0.1 atomic percent of each element in powdered copper, pressing the powder-mixture to form solid electrodes which were burned in a 10 ampere, 220 volt direct-current arc, and photographing the spectra with a stigmatic concave grating while a step sector was rotating in front of the slit. The sectored spectrograms facilitated the estimation of intensities of all element lines relative to copper lines which were then calibrated on an energy scale provided by standardized lamps, and all estimated line intensities were finally adjusted to fit this calibration. Comparisons with other intensity measurements in individual spectra indicate that the National Bureau of Standards spectral-line intensities may have average errors of 20 percent, but first of all they provide uniform quantitative values for the seventy chemical elements commonly determined by spectrochemists. All 39,000 observed lines are given in order of wavelength in part II.

COM-75-50348/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Experimentally Determined Absolute Oscillator Strengths of Ti I, Ti II, and Ti III.
Final rept.,
J. R. Roberts, P. A. Voigt, and A. Czernichowski. 1 May 75, 8p
Pub. in Astrophysical Jnl., v197 p791-798, 1 May 75.

Descriptors: *Titanium, Electron transitions, Ultraviolet spectra.
Identifiers: Reprints, *Oscillator strengths.

Absolute oscillator strengths of Ti I, Ti II, and Ti III transitions in the wavelength region from 2440 A to 3500 A have been experimentally determined using a wall-stabilized arc. Titanium in the form of heated TiC4 was admixed with argon plus 5 percent H2 and introduced into the arc, which was operated at a current of 40-60 amperes.

COM-75-50362/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Extension of the Analysis of Triply Ionized Aluminum (Al IV).
Final rept.,
Marie-Dhristine Artru, and Victor Kaufman. May 75, 4p
Pub. in Jnl. of the Optical Society of America, v65 n5 p594-599 May 75.

Descriptors: *Aluminum, *Emission spectra, Spectrum analysis, Ultraviolet spectra, Line spectra, Atomic energy levels, Ionization potential.
Identifiers: Reprints.

A total of 416 new lines of Al IV have been observed in the wavelength range 400-3900 A, leading to the determination of all of the levels of the (2p)5(4p), 4d, 4f, 5s, 5f and 5g configurations. Results of parametric calculations for these configurations are presented. An ionization energy of 967 804 + or - 15/cm has been derived.

COM-75-50363/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Term Analysis of Fe V.
Final rept.,
Jan Olof Ekberg. 1975, 8p
Pub. in Physica Scripta, v11 n1 p23-30 1975.

Descriptors: *Iron, *Emission spectra, Stripped atoms, Atomic energy levels, Spectrum analysis, Ultraviolet spectra, Stellar spectra.
Identifiers: Reprints.

The spectrum of Fe V has been observed by using a vacuum sliding-spark discharge and the 10.7-m grazing-incidence spectrograph as well as the 10.7-m normal-incidence spectrograph at the National Bureau of Standards, Washington. Almost 1000 lines have been identified in the region 302-1715 A, and all levels of (3d)4 and all but one level in each of the configurations (3d)3(4s) and (3d)3(4p) have been established. From the complete set of (3d)4 levels the forbidden lines of Fe V from 828 to 10,000 A are predicted, and a comparison is made with the spectrum of the star RR Telescopii.

COM-75-50366/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Adhesive Bonding of Various Materials to Hard Tooth Tissues. VIII. Nickel and Copper Ions on Hydroxyapatite: Role of Ion Exchange and Surface Nucleation.
Final rept.,
D. N. Misra, R. L. Bowen, and B. M. Wallace. Apr 75, 8p
Sponsored in part by American Dental Association, Chicago, Ill.
Pub. in Jnl. of Colloid and Interface Science, v51 n1 p36-43 Apr 75.

Descriptors: *Calcium phosphates, *Ion exchanging, *Surface reactions, *Nickel, *Copper, Reaction kinetics, Adsorption.
Identifiers: Reprints.

The interaction of nickelous (Ni(II)) and cupric (Cu(II)) ions with synthetic hydroxyapatite from aqueous nitrate solutions of the metal ions was investigated. Nickelous ions exchange with the calcium ions of the adsorbent and follow the Langmuir adsorption isotherm; the saturation amounts of the adsorbate for two apatite samples have approximately the same ratio as their surface areas. With Cu(II), the initial uptake seems to be independent of concentration and almost equal to the saturation amount of nickelous ion for the same apatite sample. Subsequently, the apatite dissolves in concert with the growth of copper phosphate as a separate phase on the apatite surface if an excess of cupric ion is present. This reaction follows a zero order rate law for dilute solutions. A phenomenological theory is developed which explains the various kinetic facets.

COM-75-50373/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Determination of Cadmium and Zinc in Standard Reference Materials by Atomic Fluorescence Spectrometry with Automatic Scatter Correction.
Final rept.,
M. S. Epstein, T. C. Rains, and O. Menis. 1975, 5p
Pub. in Canadian Jnl. of Spectroscopy, v20 n1 p22-26 Jan/Feb 75.

Descriptors: *Spectrochemical analysis, *Light scattering, *Cadmium, *Zinc, Trace elements, Precision, Accuracy.
Identifiers: *Interference(Chemical analysis), Reprints.

The scattering of exciting radiation by matrix components is a major physical interference for trace analysis in atomic fluorescence spectrometry (AFS), which must be eliminated before practical 'real sample' analysis can be performed. Using an instrumental arrangement for automatic scatter correction, trace cadmium and zinc are analyzed in Standard Reference Materials, Coal, Bovine Liver, Orchard Leaves, and Fly Ash, without prior separation or preconcentration. The effects of scatter and chemical interferences are evaluated for premixed argon (entrained air)-acetylene flames. Precision and accuracy of the results of AFS analysis are compared with data from analysis by atomic absorption.

COM-75-50376/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Effects of Time Ordering on Plasma-Broadened Hydrogen Profiles.
Final rept.,
Larry J. Roszman. 31 Mar 75, 4p
Pub. in Physical Review Letters, v34 n13 p785-788, 31 Mar 75.

Descriptors: *Hydrogen, *Line spectra, Atomic spectra, Plasmas(Physics).
Identifiers: Line broadening, Reprints.

The plasma-broadened H(alpha) and H(beta) spectral-line profiles of hydrogen were calculated retaining the time ordering in the S matrices of the width-shift operator by diagonalizing with the 0(4) group. Significant changes occur: Agreement with experiment is improved appreciably.

COM-75-50387/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Thermodynamics of Single-Phase One-Dimensional Fluid Flow.
Final rept.,
V. Arp. May 75, 5p
ARPA Order-2186
Pub. in Cryogenics, v15 n5 p285-289 May 75.

Descriptors: *Liquid helium, *One dimensional flow, *Thermodynamic properties, Compressibility, Acoustic velocity, Hydrodynamics.
Identifiers: Gruneisen parameter, Reprints.

Fluid flow processes in helium within the range 4 - 10K and 10 - 100 N sq cm pressure are similar to those of ordinary fluids near their critical points. Three thermodynamic parameters, the Gruneisen parameter, isentropic compressibility, and velocity of sound, which are weakly non-catalytic near the critical point, are used to describe fluid flow processes in fluids in the near critical range. It is found that if temperature is not used as a variable in a fluid state equation, flow profiles can be easily evaluated in a single-phase fluid region, including close to or transecting the transposed critical line.

N75-22378/4GA PC$3.25/MF$2.25
Unilever Research, Vlaardingen (Netherlands).
Infrared Spectra of Chemisorbed Molecules. Part 4: Hydrogenation of Some Small Alkenes on Silica-Supported Nickel.
J. Erkelens. 1975, 20p
Misc-Revised. Subm-Submitted for Publication.

Descriptors: *Butadiene, *Butenes, *Ethylene, *Infrared spectra, *Propylene, Catalysis, Chemisorption, Hydrogenation, Spectroscopic analysis.

For abstract, see STAR 1314

N75-22402/2GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Determination of Group Composition of Petroleum Fractions in a Liquid Chromatograph.
T. S. Ivanova, Y. A. Burkin, and V. G. Zizin. May 75, 6p NASA-TT-F-16289
Contract NASW-2483
Tran-Transl. Into English from Neftepererab. I Neftekhimiia (Moscow), No. 2, 1971 p 32-54.

Descriptors: *Chemical composition, *Chromatography, *Crude oil, *Fractions, Automatic test equipment, Prototypes, Recording instruments.

For abstract, see STAR 1314

N75-22403/0GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Analytical Techniques Using X-Ray Fluorescence Spectrometry.
L. Delindemann. May 75, 18p NASA-TT-F-16287
Contract NASW-2483
Tran-Transl. Into English from Riv. Combust. (Italy), V. 25, 1971 p 299-304.

Descriptors: *X ray fluorescence, *X ray spectroscopy, Crude oil, Excitation, Spectroscopic analysis.

For abstract, see STAR 1314

N75-22404/8GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Analysis of Mineral Oil by Solid-Liquid Elution Chromatography.
D. Stejaru, R. Popescu, and N. Mosescu. May 75, 11p NASA-TT-F-16273
Tran-Transl. Into English from Rev. Chim. (Bucharest), V. 20, 1969 p 756-767.

Descriptors: *Chromatography, *Hydrocarbons, *Mineral oils, Adsorbents, Chemical composition, Ultraviolet spectroscopy.

For abstract, see STAR 1314

N75-22407/1GA PC$5.25/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Thermodynamic and Related Properties of Parahydrogen from the Triple Point to 300 K at Pressures to 1000 Bar.
Final Report.
L. A. Weber. 1975, 105p NASA-SP-3088, NBSIR-74-374
NASA ORDER C-32369-C
Subm-Prepared by NBS, Boulder.

Descriptors: *High pressure, *Para hydrogen, *Thermodynamic properties, Atomic physics, Density (Mass/volume), Enthalpy, Entropy, Liquid hydrogen, Pressure measurements.

For abstract, see STAR 1314

N75-22453/5GA PC$3.75/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
The Meaning of the Basicity of Glass Melt and Attempts to Measure It, Part 2.
W. Stegmaier, and A. Dietzel. Apr 75, 31p NASA-TT-F-16272
Contract NASW-2481
Tran-Transl. Into English from Glastech. Ber. (Frankfurt AM Main), V. 18, No. 12, Dec. 1950 p 353-362.

Descriptors: *Bases (Chemical), *Chemical analysis, *Glass, Acid base equilibrium, Alkali metal compounds, Borates, Glass electrodes, Lithium oxides, Molecular structure, Potassium compounds, Sodium sulfites.

For abstract, see STAR 1314

N75-22454/3GA PC$3.75/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Observations About the Structure of Alkali Silicate Glasses and Melts after the Insertion of OH Groups.
H. Franz, and T. Kelen. May 75, 27p NASA-TT-F-16270
Contract NASW-2483
Tran-Transl. Into English from Glastech. Ber. (Frankfurt AM Main), V. 4, Issue 4, Apr. 1967 p 141-148.

Descriptors: *Alkalies, *Molecular structure, *Silica glass, *Water vapor, Binary systems (Materials), Hydroxides, Infrared spectra.

For abstract, see STAR 1314

N75-22455/0GA PC$3.75/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
The Importance of Basicity in Glass Melts and Attempts at Its Measurement, Part 1.
W. Stegmaier, and A. Dietzel. May 75, 41p
NASA-TT-F-16269
Contract NASW-2483
Tran-Transl. Into English from Glastech. Ber. (Frankfort), V. 18, No. 11, Nov. 1940 p 297-308.

Descriptors: *Alkalies, *Borates, *Glass, Electrochemistry, Oxygen ions.

For abstract, see STAR 1314

N75-22641/5GA PC$3.25/MF$2.25
Unilever Research, Vlaardingen (Netherlands).
Non-Ideal Phase Behaviour of Binary Mixtures of Triglycerides with Mono- and Diglycerides.
M. Knoester, and D. J. Dejong. 1975, 21p
Subm-Submitted for Publication.

Descriptors: *Binary fluids, *Glycerides, *Liquid phases, *Solubility, Heat of solution, Ideal fluids, Mixing, Phase diagrams, Thermodynamic properties.

For abstract, see STAR 1314

PAT-APPL-518 539/GA PC$3.75/MF$2.25
Department of the Navy Washington D C
Tubular Mercury Graphite Electrode.
Patent Application,
Stephen H. Lieberman. Filed 29 Oct 74, 32p
Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Polarographic analysis, *Electrodes, Thin films, Mercury, Tubes, Graphite, Trace elements, Sea water, Patents.
Identifiers: *Patent applications, PAT-CL-204-1-T, Water analysis, *Anodic stripping voltammetry.

The patent application describes an apparatus for and a method of determining the presence and concentration of trace metals in seawater which relies on anodic stripping voltammetry. A tubular mercury-graphite electrode is suitably coupled to receive a flowing mercury plating solution and a thin film of mercury is deposited on the inner surface of the electrode when a plating potential is coupled to the electrode. Next, a seawater sample is pumped through the electrode and trace metals are reduced onto the active mercury film when the plating potential is reconnected to the electrode. At discrete levels within a scanning potential gradient certain ones of the trace metals are stripped from the active metal film and the values of the currents at these levels are monitored and recorded. Zinc, cadmium, lead and copper concentrations are readily observable. The method and apparatus are capable of nearly real-time iteration to enable a more accurate determination of trace metal concentration.

PB-242 139/4GA PC$3.75/MF$2.25
Bureau of Mines, Pittsburgh, Pa. Pittsburgh Mining and Safety Research Center.
Measuring the Methane Content of Bituminous Coalbeds,
C. M. McCulloch, J. R. Levine, F. N. Kissell, and Maurice Deul. Apr 75, 27p BuMines-RI-8043

Descriptors: *Bituminous coal, *Methane, *Coal deposits, *Drill core analysis, Friability, Coring, Desorption, Chemical composition, Graphic methods.

The methane content of virgin bituminous coalbed can now be measured accurately in the field with exploration core samples from vertical boreholes. The gas content of the coal per unit weight can be used either to design a mine ventilation system or to determine if degasification of the coalbed will be necessary before mining, and to determine the gas resources in the coalbed. The gas content of the coal in place in the ground is determined by summing the gas lost from coring, gas measured during desorption, and the residual gas in the coal. Upon removal from the borehole, the core sample is placed in an airtight container and desorbed for several weeks until the desorption rate is below 0.05 cc/g for 5 consecutive days. The gas lost from the core while it was being cored and the residual gas are estimated by a new graphical method. The amount of gas remaining depends upon whether the coal is friable or blocky. Friability appears to relate to the depth of the sample below the surface, fixed carbon percentage, Hardgrove grindability index, and proximity to tectonic disturbance. Coalbeds that are ill defined as to their blocky or friable nature must be tested in the laboratory for unambiguous analysis.

PB-242 285/5GA PC$3.75/MF$2.25
National Environmental Research Center, Research Triangle Park, N.C. Quality Assurance and Environmental Monitoring Lab.
Evaluation of Effects of NO, CO2, and Sampling Flow Rate on Arsenite Procedure for Measurement of NO2 in Ambient Air.
Final rept.,
M. E. Beard, J. Suggs, and J. Margeson. Apr 75, 32p EPA/650/4-75-019

Descriptors: *Nitrogen dioxide, *Gas analysis, Arsenites, Nitrogen oxide(NO), Carbon dioxide, Flow rate, Performance evaluation.
Identifiers: Interference(Chemical analysis).

The arsenite method for measurement of NO2 in ambient air was investigated to quantify the effect of sampling flow rate and NO and CO2 concentration on method response. NO and CO2 were previously identified as positive and negative interferents in the method. Flow rates of 220 to 270 cc/min had no effect on the method response; higher flow rates decreased the method response. Atmospheres containing NO2, CO2, and NO were sampled with the arsenite method in a 3x3x3 factorial experiment with five observations per cell. The concentrations were NO2--50, 150, and 250 micrograms/cu m; NO--50, 180, and 310 micrograms/cu m; CO2--200, 350, and 500 ppm.

PB-242 294/7GA PC$3.75/MF$2.25
National Environmental Research Center, Research Triangle Park, N.C. Quality Assurance and Environmental Monitoring Lab.
Evaluation of Gas Phase Titration Technique as Used for Calibration of Nitrogen Dioxide Chemiluminescence Analyzers.
Final rept.,
E. Carol Ellis, and John H. Margeson. Apr 75, 49p EPA/650/4-75-021

Descriptors: *Nitrogen dioxide, *Gas analysis, *Calibration, Ozone, Chemiluminescence, Gases, Volumetric analysis, Performance evaluation.
Identifiers: *Chemiluminescence method.

A detailed method write-up describing the chemiluminescence procedure for the continuous measurement of nitrogen dioxide in ambient air was developed. Atmospheric concentrations of NO2 are measured indirectly by the chemiluminescence reaction of nitric oxide (NO) with ozone (O3). The NO2 is first thermally reduced to NO before it is reacted with O3. The reliability of measurements made by a continuous or instrumental sampling method is strongly affected by its calibration. In the chemiluminescence procedure, an NO2 analyzer is calibrated by the gas phase titration of NO with O3 that produces NO2 stoichiometrically. The gas phase titration calibration procedure was subjected to a ruggedness test. The results indicate that normal variations in such factors as reaction and mixing chamber volumes, ratio of dilution air flow to flow through the ozone generator, use of difference ozone generators with different dilution air flows, and use of different standard NO levels had little effect on the gas phase titration procedure.

PB-242 295/4GA PC$4.75/MF$2.25
Geomet, Inc., Pomona, Calif.
Improvement of Instrumentation and Methodology for Collection and Analysis of Mercury.
Final rept. Apr-Sep 74,
D. J. Sibbett, R. H. Moyer, and T. R. Quinn. Jan 75, 84p GEOMET-LF-434 EPA/650/2-75-028
Contract EPA-68-02-1282

Descriptors: *Mercury(Metal), *Gas sampling, *Aerosols, *Chemical analysis, Gas analysis, Vapors, Particles, Samplers, Absorbers(Materials), Mercury organic compounds, Absorbers(Equipment), Engineering drawings, Design, Gas flow, Calibration, Charcoal, Aluminum oxide, Silver, Performance evaluation.
Identifiers: *Air pollution detection, Mercury/dimethyl, Interference(Chemical analysis).

A collection device for the sampling of atmospheric mercury in its three forms, was

miniaturized and streamlined and methods for the recovery and analysis of the collected mercury were simplified. The device consists of a two-section canister assembly which fits inside a standard Hi-Vol sampler underneath the support screen for the particulate filter. While particulate mercury is collected in the usual manner on glass fiber filter, mercury vapors are trapped on specific absorbants, i.e. elemental mercury on silver-impregnated alumina in the upper canister section and combined mercury vapors on charcoal in the lower section. Procedures have been developed and tested for the recovery and analysis of elemental mercury, dimethyl mercury and mercury-bearing particulates. These methods use standard laboratory instrumentation including an induction combustion furnace and an atomic absorption spectrophotometer.

PB-242 492/7GA PC$3.75/MF$2.25
Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Research Group.
The Diffusion Coefficient of Ferricyanide in Aqueous Potassium Chloride Solutions with and without Polyethylene Oxide,
J. J. v.d. Graaf. Feb 75, 43p CSIR-CENG-068, ISBN-0-7988-0650-8

Descriptors: *Diffusion coefficient, Aqueous electrolytes, Potassium chloride, Temperature, Polyoxyethylene, Iron cyanides, Density(Mass/volume), South Africa, Viscosity.
Identifiers: *Ferrate/hexacyano, Ferrite/hexacyano, Metal complexes.

The diffusion coefficient of the ferricyanide ion was determined in the temperature range 20-35C in equimolar solutions of ferri- and ferrocyanide (.005M) with potassium chloride (0,5; 1,0; 2,0 M) as a carrier electrolyte and with and without polyethylene oxide (0; 50; 100 ppm). The methods used were mass transfer on a rotating disk electrode and chronoamperometry in a linear diffusion cell. Density and viscosity data on the solutions are given.

PB-242 501/5GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
The Coulometric Determination of Sulphur in Steel,
H. J. Boniface, and R. H. Jenkins. Mar 75, 8p BISRA-SM/235/A

Descriptors: *Steels, *Sulfur, *Chemical analysis, Sulfur dioxide, Combustion products, Coulometers, Great Britain.
Identifiers: *Coulometric titration.

A method is described for the precise determination of sulphur in steel. Oxides of sulphur evolved from steel under the IRSID conditions (Pontet and Boulin) are absorbed in aqueous medium and titrated coulometrically. The coulometric procedure can be automated, but is intended here to provide a reference method. Reproducibility index was found to be 0.0016%S at the 0.05%S level.

PB-242 502/3GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
A Method for the Spectrographic Analysis of Small Amounts of Non-Metallic Steelworks Materials,
A. Hodkinson. Mar 75, 8p BISRA-SM/589/A

Descriptors: *Spectrochemical analysis, *Spectrographs, Corrosion products, Dust, Water, Great Britain.

A published method for the quantitative analysis of a wide variety of materials by emission spectrometry has been modified to suit the Hilger Large Quartz Spectrograph. The technique, which has been developed for determining 19 elements in milligram amounts of corrosion deposits, dusts, water residues and other miscellaneous materials, is described. Examples of its application are appended.

PB-242 503/1GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
The Coulometric Determination of Carbon in Steel,
H. J. Boniface, and R. H. Jenkins. Mar 75, 15p BISRA-SM/155/A

Descriptors: *Steels, *Chemical analysis, *Carbon, Combustion products, Carbon dioxide, Performance evaluation, Great Britain.
Identifiers: *Coulometric titration.

A method suitable for referee analysis has been developed for the precise determination of carbon in steel. It employs coulometric titration of carbon dioxide absorbed in an almost non aqueous medium. The apparatus is inexpensive and the procedure is simple. Suggestions are made for automating the technique to provide a rapid routine method of high precision. The analytical performance of the recommended method compares well with that of low pressure volumetric methods. Standard deviations of 0.00035% at the 0.05%C level to 0.004% at the 1% carbon level have been obtained.

PB-242 515/5GA PC$7.00/MF$2.25
Abcor, Inc., Cambridge, Mass. Walden Research Div.
Investigation of Extractive Sampling Interface Parameters.
Final rept.,
K. J. McNulty, J. F. McCoy, J. H. Becker, J. R. Ehrenfeld, and R. L. Goldsmith. Oct 74, 191p EPA/650/2-74-089
Contract EPA-68-02-0742

Descriptors: *Samplers, *Stack gases, *Gas sampling, Gas detectors, Calibration, Design, Performance, Electric power plants, Interfaces, Gas flow, Testing.
Identifiers: Nitric acid plants, Sulfuric acid plants, Gas surface interactions.

The document is the result of a twelve month, three-phase investigative program with the intent of providing EPA with sufficient information to permit the establishment of minimum specifications for the design of continuous extractive sample interface systems. An extractive sampling interface system is the equipment associated with an instrumental source measurement system which extracts, transports, and conditions a sample of the source effluent. The work in this program was directed toward an investigation of interface systems for use on Category I sources for the following instrumental techniques: (1) non-dispersive infrared analyzers, (2) ultra-violet analyzers, (3) electrochemical sensors, and (4) chemiluminescent analyzers. Both laboratory and field results are reported.

7E. Radio and Radiation Chemistry

AD-A011 517/0GA PC$3.25/MF$2.25
Auckland Univ (New Zealand) Dept of Chemistry
The Radiolysis of Aqueous Solutions of Cysteine in the Presence of Oxygen,
A. A. Al-Thannon, J. P. Barton, J. E. Packer, R. J. Sims, and C. N. Trumbore. 22 Nov 73, 19p AFOSR-TR-75-0771
Grant AF-AFOSR-1417-68
Availability: Pub. in International Jnl. for Radiation Physics and Chemistry, v6 p233-248 1974.

Descriptors: *Cysteine, *Radiolysis, Solutions(General), Water, Oxygen, Chemical reactions, pH factor, Reprints.

Further experimental data on the radiolysis of cysteine in the presence of oxygen are presented. It is shown that the reaction RSH(-)+O2 yields RSH+O2(-), which has been suggested for mercaptoethanol, does not occur with cysteine, that the radical HOO does not abstract H from cysteine, but that O2(-) does. An attempt is made to rationalize all reported experimental data in terms of two pH-dependent free radical chain reaction. The chain terminating reactions are discussed, and it is suggested that the products of reduction of RSOOH by RSH are pH-dependent, H2O2 being produced at low pH, and H2O at pH>5.

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A011 372/0GA PC$8.75/MF$2.25
Maryland Univ Solomons Natural Resources Inst
Effects of Suspended and Deposited Sediments on Estuarine Organisms. Phase II.
Final rept. 17 Sep 70-31 Dec 73,
J. A. Sherk, J. M. O'Connor, D. A. Neumann, R. D. Prince, and K. V. Wood. Mar 74, 299p Rept no. Ref-74-20
Contract DACW72-71-C-0003
See also report dated Apr 70, AD-763 227.

Descriptors: *Sediments, *Estuaries, *Aquatic organisms, Fishes, Mortality rates, Marine biology, Water pollution, Ecology.
Identifiers: *Suspended sediments, *Water pollution effects(Animals), Biological productivity, Patuxent River.

A three-year laboratory study identified biological components of selected populations of estuarine organisms which were most sensitive to the effects of particle size and concentration of (1) suspended mineral solids similar in size to sediments likely to be found in, or added to, estuarine systems in concentrations typically found during flooding, dredging, and disposal of dredged material, and (2) natural sediments in idential experiments. Significant mortality of estuarine fishes was demonstrated at these suspended solids concentrations. Early life states were more sensitive to suspended solids than adults. Bioassays with natural sediments indicated that suspensions of natural muds affect fishes in the same way as fuller's earth, but higher concentrations of natural material were required to produce the same level of response. Carbon assimilation by four species of phytoplankton was significantly reduced by the light attenuating properties of fine silicon dioxide suspensions.

N75-23065/6GA PC$3.75/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Variations in the Ratio in Vivo-Fluorescence/alpha-Chlorophyll and Its Application to Oceanography. Effect of Limiting Different Nutrients, of Night and Day and Dependence on the Species under Investigation.
D. Blasco. May 75, 26p NASA-TT-F-16317
Contract NASW-2483
Tran-Transl. Into English from Invest. Pesq. (Spain), V. 37, No. 3, Dec. 1973 p 533-556.

Descriptors: *Chlorophylls, *Phosphorescence, *Plankton, *Spectroscopic analysis, *Technology utilization, Algae, Chloroplasts, Mineral metabolism, Oceanography, Photoluminescence.

For abstract, see STAR 1314

8B. Cartography

AD-A011 179/9GA PC$3.25/MF$2.25
Army Engineer Topographic Labs Fort Belvoir Va
Parallel Optical Processing to Convert Elevation Data to Slope Maps. Phase 1. Theoretical Analysis.
Research note Jul 72-Oct 74,
Robert K. Brooke, Jr. Oct 74, 23p Rept no. ETL-RN-74-9

Descriptors: *Mapping, Parallel processing, Fourier transformation.
Identifiers: Automatic mapping, *Optical data processing.

Given a photographic transparency with an amplitude transmittance function, t(x sub o, y sub o), that is equivalent to a functional representation of elevation information, h (x sub o,y sub o), for a particular geographic area, the slope information can be rapidly displayed using a coherent optical system and a one-dimensional differentiating filter. Implementation of this technique could provide an electro-optical system for the high speed conversion of elevation data to a slope map. It is concluded that slope map displays can be obtained from elevation function transparencies, though negative and positive slopes of the same magnitude are displayed identically. This is not expected to affect the utility of the output.

AD-A011 446/2GA PC$3.25/MF$2.25
Army Engineer Topographic Labs Fort Belvoir Va
An Automated Technique for Measuring Built-Up Urban Areas from Map Graphics Through Analog Image Processing.
Research note, Dec 74-Jan 75,
Lawrence P. Murphy, and William W. Abbe. May 75, 22p Rept no. ETL-0012

Descriptors: *Mapping, *Urban areas, *Image processing, Analog signals, Cathode ray tube screens, Scanners, Computer graphics.

This research report describes a production application using experimental analog (video) image processing equipment for measuring areas (Kilometers squared) depicted on graphic map input as built-up urban areas. The note concludes that state-of-the-art analog image processing components can be configured and used to measure built-up areas in one-twelfth of the time required by conventional manual means.

E75-10312 PC$4.25/MF$2.25
Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.
Surface Compositional Mapping by Spectral Ratioing of ERTS-1 MSS Data in the Wind River Basin and Range Wyoming.
Final rept. Sep 72-Sep 74,
Robert K. Vincent, R. C. Salmon, W. W. Pillars, and J. E. Harris. Jun 75, 73p ERIM-193300-32-F NASA-CR-142855
Contract NAS5-21783
Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Wind River Basin(WY), Minerals, Rocks, Iron compounds, Photomapping, Multispectral band scanners, Earth resources program, Pattern recognition, Data processing.

The author has identified the following significant results. ERTS data collected in August and October 1972 were processed on digital and special purpose analog recognition computers using ratio enhancement and pattern recognition. Ratios of band-averaged laboratory reflectances of some minerals and rock types known to be in the scene compared favorably with ratios derived from the data by ratio normalization procedures. A single ratio display and density slice of the visible channels of ERTS MSS data, Channel 5/Channel 4 (R5,4), separated the Triassic Chugwater formation (redbeds) from other formations present and may have enhanced iron oxide minerals present at the surface in abundance. Comparison of data sets collected over the same area at two different times of the year by digital processing indicated that spectral variation due to environmental factors was reduced by ratio processing.

8C. Dynamic Oceanography

AD-A011 158/3GA PC$3.25/MF$2.25
Lamont-Doherty Geological Observatory Palisades N Y
Subsurface Eddies in the Arctic Ocean and Baroclinic Instability.
Book article,
Kenneth L. Hunkins. 1975, 9p Rept no. LDGO-2170
Contract N00014-67-A-0108-0016
Availability: Pub. in Climate of the Arctic, p398-406 1975.

Descriptors: *Ocean currents, *Eddy currents, Arctic ocean, Subsurface, Transients, Stratification, Instability, Sea water, Temperature, Salinity, Gradients, Density, Sea ice, Circulation, Rossby waves, Reprints.
Identifiers: *Baroclinic instability, AIDJEX project.

On four occasions in March and April of 1972 transient undercurrents associated with eddies were observed at depths between 50 and 300 m. The velocity profile was parabolic with a maximum of 40 cm/sec at 150m. A distortion of the salinity and temperature field accompanied these currents, and gradient equilibrium was closely approached in each case. Two of the eddies were anticyclonic and two cyclonic. The lifetime of the eddies is not known but they persisted for at least several days and probably endured much longer. The eddies were 10 to 20 km in diameter and separated by 20 to 50 km from each other although the time and space scales were not always clearly resolved. The subsurface currents in the eddies were swifter than the wind-driven currents in the upper mixed layer which usually had speeds of less than 10 cm/sec and there seemed to be little correlation between the two levels. The eddies are believed to have their origin in the instability of the basic baroclinic current. The large-scale geostrophic current was about 1 cm/sec in the upper few hundred meters of the observation area in the permament arctic anticyclonic gyre. The gyre has a lens-shaped surface water mass of low salinity produced in the Arctic, overlying high-salinity water originating in lower altitudes. There is thus a large-scale horizontal salinity gradient produced by global conditions of oceanic precipitation-evaporation and modified by wind conditions.

AD-A011 303/5GA PC$3.25/MF$2.25
Scripps Institution of Oceanography La Jolla Calif
Horizontal Scales of Midocean Internal Tides,
T. P. Barnett, and R. L. Bernstein. 7 Nov 74, 5p Rept no. IDOE75-403
Contract N00014-75-C-0260
Availability: Pub. in Jnl. of Geophysical Research, v80 n15 p1962-1964, 20 May 75.

Descriptors: *Ocean tides, North Pacific Ocean, Deep oceans, Internal waves, Sea water, Temperature, Diurnal variations, Spatial distribution, Subsurface, Horizontal orientation, Deep water, Thermoclines, Correlation techniques, Time series analysis, Coherence, Reprints.

The space scales associated with the semidiurnal tides in the central Pacific are investigated by using time series of temperatures obtained from moored buoy arrays. Excellent phase coherence was found in the vertical from near the surface to depths exceeding 150 m. Phase coherence existed horizontally over distances of at least 5 but less than 50 km. With one exception the thermobaric energy associated with the semidiurnal tide showed no coherence in either the vertical (0-150 m) or the horizontal (5-500 km). (Author)

AD-A011 406/6GA PC$5.75/MF$2.25
Stanford Research Inst Menlo Park Calif
Measurement of Sea Scatter and Buoy Tracks at Long Ranges by High-Resolution OTH-B Radar.
Technical rept. 1 Dec 73-30 Sep 74,
W. F. Marshall, and J. R. Barnum. Jan 75, 128p Rept nos. TR-1, SRI-TR-3071-1
Contract N00014-74-C-0138
Sponsored in part by National Science Foundation, Washington, D.C.

Descriptors: *Radar tracking, *Air water interactions, *Ocean surveillance, Buoys, Ships, North Pacific Ocean, Over the horizon detection, Backscattering, High frequency, Doppler effect, Data processing, Ocean surface, Radar images, Measurement, Wind direction, Ocean waves, Wind velocity, Mapping, Oceanographic ships.
Identifiers: *Sea backscattering, Remote sensing, Washington vessel, Flip vessel, North Pacific Experiment.

A land-based over-the horizon backscatter (OTH-B) high-frequency (HF) radar located in California has been used for remote-monitoring operations in the Pacific Ocean north of Hawaii in support of the North Pacific Experiment (NORPAX). The radar has (1) detected and accurately tracked drifting buoys, each carrying a low-power HF repeater, (2) provided accurate position data on two research vessels, and (3) recorded sea backscatter data for subsequent correlation of Doppler spectra with measurements of wind direction, wind speed, and wave height.

AD-A011 414/0GA PC$4.25/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
The WAVE32 Program.
Computer programming note,
S. Larson, and A. E. Anderson, Jr. Feb 73, 63p Rept no. EPRF-CP Note-8

Descriptors: *Ocean waves, *Computer programs, *Sea states, Height finding, Mediterranean Sea, Computations, Air water interactions, Wind direction, Wind velocity.
Identifiers: WAVE32 computer program.

The purpose of WAVE32 is to provide a sea state record which can be accessed by MLDZOOM to model mechanical mixing effects in the upper layer of the Mediterranean Sea. It produces an analysis of wave height (sea) using a modified geostrophic wind derived from a local pressure analysis. The wave height field is stored on tape for use by MLDZOOM, another program in the package. Other analysis fields produced by WAVE32 are wind direction, wind speed, and wave period.

NTIS/PS-75/525/6GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
The Gulf Stream (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Audrey S. Hundemann. Jun 75, 115p*

Descriptors: *Gulf stream, *Bibliographies, Sea water, Ocean currents, Salinity, Temperature, Transport properties, Remote sensing.

Abstracts dealing primarily with the Gulf Stream's currents, salinity, temperature and transport properties are presented. A few abstracts pertain to oceanographic equipment used in the studies. Remote sensing studies are included. (Contains 110 abstracts).

N75-23072/2GA PC$6.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Wave Climate Model of the Mid-Atlantic Shelf and Shoreline (Virginian Sea): Model Development, Shelf Geomorphology, and Preliminary Results.
V. Goldsmith, W. D. Morris, R. J. Byrne, and C. H. Whitlock. 1974, 153p NASA-SP-358, VIMS-SRAMSOE-38

Descriptors: *Atlantic ocean, *Coastal water, *Dynamic models, *Water waves, Computerized simulation, Continental shelves, Geomorphology, Ocean bottom, Oceanography, Refracted waves.

For abstract, see STAR 1314

N75-23073/0GA PC$9.25/MF$2.25
Delft Hydraulics Lab. (Netherlands). De Voorst Lab.
Offshore Sediment Transport and Equilibrium Beach Profiles.
Ph.D. Thesis - Delft Univ. of Technol.
D. H. Swart. Dec 74, 318p PUBL-131
Subm-Sponsored by Dutch Min. Of Public Works.

Descriptors: *Beaches, *Equilibrium, *Sediment transport, Coastal currents, Frontal waves, Three dimensional flow, Tidal waves, Time functions, Transport theory, Two dimensional flow, Water waves.

For abstract, see STAR 1314

N75-23074/8GA PC$3.25/MF$2.25
Delft Hydraulics Lab. (Netherlands).
Equilibrium Profiles of Coarse Material under Wave Attack.
E. Vanhijum. Sep 74, 21p PUBL-133
Conf-Presented at the 14TH Intern. Conf. On Coastal Eng., Copenhagen, 24-28 Jun. 1974.

Descriptors: *Beaches, *Gravels, *Tidal waves, Critical velocity, Equilibrium, Scale effect, Sediment transport, Slopes, Transport theory, Wave interaction.

For abstract, see STAR 1314

PB-242 261/6GA PC$5.25/MF$2.25
Florida Univ., Gainesville. Coll. of Engineering.
Investigation of the Velocity Field Over Waves Using a Wave Follower,
O. H. Shemdin, and R. J. Lai. Jun 73, 124p TR-18
Contract DACW72-71-C-0020, Grant NSF-GK-31205

Descriptors: *Ocean waves, *Wind(Meteorology), *Air water interactions, Measurement, Turbulent flow, Reynolds number, Stresses, Power spectra, Spectrum analyzers, Anemometers, Wind tunnels, Correlation techniques.

The turbulent velocity field over a simple propagating waves is investigated by hot-film sensors in a wind and wave facility. Use is made of a wave follower to obtain measurements below the wave crest level. Turbulence measurements are obtained in a wave following frame over the range 1.75 - 25 cm above the instantaneous water level. The measurements are transformed to an Eulerian frame and compared to measurements obtained from fixed probes over a height range 10-50 cm above the mean water level. In the overlap region the transformed wave following results are in reasonable agreement with the fixed probes results. The measurements below the crest level indicate rapid variations in Reynolds stresses and wave induced velocities. The results suggest nonlinear wave induced perturbations close to the water surface and reveal weaknesses in assumptions adopted in recent theoretical models of turbulent shear flows over waves.

TT-74-53002 PC$8.50/MF$2.25
National Science Foundation, Washington, D.C. Office of Polar Programs.
Automatization of Gathering and Analysis of Scientific Information on the Problem of Atmosphere and Ocean Interaction (Automatizatsiya Sbora i Analiz Nauchnoi Informatsii v Probleme Vzaimodeistviya Atmosfery i Okeana),
E. P. Borisenkov, and I. A. Dyubokiz. 1972, 253p Trans. of Arkticheskii i Antarkticheskii Nauchno-Issledovatelskii Institut. Trudy (USSR) v301 139p 1972 by Geti Saad. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Air water interactions, *Data processing, *Arctic regions, *Antarctic regions, Oceanographic ships, Automation, Translations, USSR.

8F. Geography

COM-75-10844/9GA PC$3.25
Delaware Univ., Newark. Coll. of Marine Studies.
A Model for the Evolution of Linear Tidal-Built Sand Ridges in Delaware Bay, U.S.A.,
Charles B. Weil, Roger D. Moose, and Robert E. Sheridan. 1974, 8p DEL-SG-5-75 NOAA-75052004
Grants NOAA-2-35223, NSF-GH-109
Presented at the International Symposium on Interrelationships of Estuarine and Continental Shelf Sedimentation, Bordeaux, France, 9-14 Jul 73. Prepared in cooperation with Duke Univ., Beaufort, N.C. Marine Lab. Grant NSF-GB-27725. Pub. in Memoires de l'Institut de Geologie du Bassin d'Aquitaine, n7 p343-347 1974.

Descriptors: *Coastal topographic features, *Beach ridges, *Delaware Bay, Tidal currents, Geomorphology, Beach erosion, Sandbars, Bathymetry, Seismic reflection method, Continental shelves, Models.
Identifiers: Reprints, *Shoals, Sea Grant program.

Delaware Bay is a 700 square mile tidal estuary on the Atlantic coastal plain. Subparallel linear sand shoals separated by tidal current channels dominated the central portion of the Bay. The shoals have an asymmetric cross section and lie on a flat muddy substrate. Close examination of seismic records and comparative studies of bathymetric charts indicate that the Delaware Bay shoals differ from those of the Atlantic Continental Shelf and North Sea because they migrate away from rather than toward their steep face. The purpose of the paper is to describe the morphology, behavior, and internal features of three typical linear shoals and to present models for the formation and development of the linear shoals based on the Bay's configuration, the observed features of the shoals and theoretical considerations.

E75-10304 PC$3.25/MF$2.25
Environmental Research Inst. of Michigan, Ann Arbor.
Study of Recreational Land and Open Space Using Skylab Imagery.
Monthly progress rept.,
Irvin J. Sattinger. 13 May 75, 3p ERIM-103300-50-L NASA-CR-142848
Contract NAS9-13283

Descriptors: Land use, Michigan, Vegetation, Wetlands, Trees(Plants), Recreation, EREP, Skylab program, Infrared photography, Multispectral band scanners, Spectral signatures.

The author has identified the following significant results. A preliminary analysis of the Gratiot-Saginaw game area was conducted for the matrix probabilities of misclassification for both multispectral scanner signatures and the ERTS signatures. This analysis indicated that certain signatures of similar vegetation types had relatively high probabilities of misclassification and should logically be combined into a single signature for each major class. This would result in a single class of trees having a broad range of crown densities and two or three types of wetlands. It was clear that substantially different terrain classes could be reliably discriminated. It was also noted that areas of pine and regenerated aspen could be discriminated from other surface types.

E75-10305 PC$3.25/MF$2.25
Environmental Research Inst. of Michigan, Ann Arbor.
Study of Recreational Land and Open Space Using Skylab Imagery.
Monthly progress rept.,
Irvin J. Sattinger. 14 Apr 75, 3p ERIM-103300-47-L NASA-CR-142849
Contract NAS9-13283

Descriptors: Land use, Michigan, Recreation, Wildlife, Vegetation, EREP, Skylab program, Multispectral band scanners, Forests, Agriculture, Crop identification.

The author has identified the following significant results. The data quality, production of photographic enlargements, and digital printout that displayed the Gratiot-Saginaw game area were assessed, using histogramming of each spectral channel. Results showed some dissimilarities in the ranges of data values for even and odd numbered SDO's in order to depict many of the major scene classes. Major cover types were identified and located on aerial photos and maps.

E75-10309 PC$3.25/MF$2.25
Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
An Interdisciplinary Analysis of Multispectral Satellite Data for Selected Cover Types in the Colorado Mountains, Using Automatic Data Processing Techniques.
Monthly progress rept.,
Roger M. Hoffer. May 75, 11p NASA-CR-142910
Contract NAS9-13380

Descriptors: Colorado, Rocky Mountains(North America), Forests, Minerals, Snow cover, Vegetation, EREP, Skylab program, Lakes, Multispectral band scanners, Algorithms, Trees(Plants), Rocks.

The author has identified the following significant results. MSS data on the area near Lake Hope and San Miguel on the Ophir and Mt. Wilson quadrangles were classified. Two vein-like areas of alteration were apparent, along with the hill wash composed primarily of altered rock. These areas were quite delineated. A small oval patch of shadowed alteration was classified in a location in which alteration was previously unnoticed during an airphoto study.

8G. Geology and Mineralogy

AD-A011 159/1GA PC$3.75/MF$2.25
Lamont-Doherty Geological Observatory Palisades N Y

Late Quaternary Climatic Changes in the Norwegian and Greenland Seas.
Book article,
Thomas B. Kellogg. 1974, 34p Rept no. LDGO-2172
Contract N00014-67-A-0108-0004, Grant NSF-GX-28671
Availability: Pub. in Climate of the Arctic, p3-36 1975.

Descriptors: *Norwegian Sea, *Marine climatology, Greenland, History, Core sampling, Deep oceans, Seasonal variations, Carbonates, Foraminifera, Temperature, Ocean currents, Sea ice, Glaciers, Reprints.
Identifiers: Paleoclimatology, Quaternary(Geology), Norwegian current.

Analyses of total carbonate and coarse fraction content in 29 deep-sea cores and faunal analyses of plank-tonic foraminifera in 7 cores provide climatic data for the past 150,000 years. These data show that temperatures have been much colder than at present for most of the past 150,000 years in the Norwegian and Greenland Seas. Only during the Eemian interglacial did temperatures moderate to about present levels. Quantitative paleo-temperature estimates, derived by applying the Imbrie and Kipp technique to seven cores, show that except for the Eemian and Recent interglacials, temperatures less than 0C in winter and 5C in summer prevailed throughout the region. This temperature regime is identical to that of the northwestern Greenland Sea today, where sea-ice is present during the winters. For about 100,000 of the past 127,000 years, therefore, ice has probably covered most or all of the Norwegian and Greenland Seas, at least during the winters. The Norwegian Current, a branch of the Gulf Stream, is responsible for the relatively warm climate of Scandinavia at the same latitude where Greenland supports an ice cap. In addition, the Norwegian Current controls the present distributions of planktonic and benthonic foraminifera and the present extent of sea-ice cover. Based on faunal and sedimentary changes in the deep-sea cores, most of the past 150,000 years (at least) was characterized by a surface water circulation pattern in which the Norwegian Current was either much weaker or absent, thus allowing sea-ice formation throughout the region. The only exception to this observation occurs during the Eemian interglacial when conditions were comparable to those of the present.

AD-A011 268/0GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Geophysical Investigation, Prado Dam and Mentone Damsite, California.
Final rept.,
Joseph R. Curro, Jr., George R. Skoglund, and Robert F. Ballard, Jr. Jun 75, 78p Rept no. AEWES-Misc-Paper-S-75-6

Descriptors: *Dams, *Faults(Geology), Foundations(Structures), Seismic waves, Refraction, Sites, Test methods, Surface waves, Geophones, Geological survey, Stability, California.
Identifiers: Chino Fault, Prado Dam, Mentone Dam.

A geophysical site investigation consisting of surface-refraction seismic and crosshole tests was conducted at the Prado Dam and the Mentone Damsite near Los Angeles, California, and a surface-refraction seismic line was run in an effort to confirm the location of the Chino Fault. Eight locations at Prado Dam and three locations at Mentone Damsite were investigated by geophysical methods. P- and S-wave velocities were determined as a function of depth below the ground surface.

AD-A011 311/8GA PC$4.25/MF$2.25
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
Gamma-Ray Spectrometer Study.
Final contract rept. Jun 72-1 Apr 75,
Robert M. Haralick, and John Adams. Feb 75, 57p Rept no. CRES-TR-227-2 ETL-0008
Contract DAAK02-72-C-0550

Descriptors: *Gamma ray spectroscopy, *Soils, *Natural radioactivity, Geochemistry, Gamma ray spectrometers, Potassium, Thorium, Uranium, Aerial photography, Data processing.
Identifiers: Remote sensing.

Gamma-ray spectrometer measurements have been applied to a large variety of problems in rock and soil mapping, terrain analysis, trafficability, snow water equivalent estimation, detection of environmental contaimination by nuclear fission products, and direct and indirect mineral exploration. Fuller utilization of gamma spectrometric outputs is currently limited by the inadequacy of data reduction and presentation techniques. This report describes a data reduction technique designed to detect spatially contiguous ground regions which are homogeneous in thorium, uranium, and potassium content. The data reduction technique was applied to gamma-ray spectrometric data obtained at an altitude of 50 feet in the Garden City, Kansas area. Results indicate that 83% of the homogeneous areas detected by the technique can be directly interpreted on the basis of information contained in simultaneously obtained imagery.

AD-A011 402/5GA PC$4.25/MF$2.25
George Washington Univ Washington D C Inst for the Study of Fatigue Fracture and Structural Reliability
Constitutive Equations of Rock with Shear Dilatancy.
Final technical rept.,
Alfred M. Freudenthal. Apr 75, 54p ARO-11378.2-E
Grant DA-ARO-D-31-124-73-G194

Descriptors: *Rock mechanics, Shear properties, Seismic waves, Ground motion, Wave propagation, Tectonics, Shear stresses.
Identifiers: Shear dilatancy, *Earthquake engineering, Constitutive equations.

Coupling between dilatation and shear stress referred to as 'dilatancy,' has been shown to be a significant feature of rocks. Dilatancy has been identified by Lord Kelvin (1875) and by Reiner (1947) as a second-order effect in the isotropic continuum that arises from the application of the 'principle of material indifference'. Relations required for the interpretation of tests results in the light of this theory are derived. It is shown that dilatancy in rocks is not the result of cracking at compressive stresses below the limit of shear failure, but its cause. Shear-induced density-gradients of physically significant magnitude are believed to provide the key to the understanding of important aspects of the behavior of rocks and rock-like solids.

AD-A011 460/3GA PC$3.25/MF$2.25
University of South Alabama Mobile Dept of Geology and Geography
Weathering of Yucatan Limestones: The Genesis of Terra Rosas.
W. C. Isphording. 1974, 18p ARO-11269.1-EN
Grant DA-ARO-D-31-124-73-G145

Descriptors: *Limestone, *Dolomite, *Weathering, Soils, Alumina, Ores(Metal sources), Mexico, Jamaica, Tropical regions.
Identifiers: Bauxite, Yucatan Peninsula.

The Yucatan Peninsula is the largest area of exposed carbonate rocks in the Caribbean region and provides an ideal site to study the weathering of limestones and dolomites under tropical conditions. Study of the residual Yucatan soils may provide information on the origin of Jamaican bauxites. The Yucatan Peninsula has a wide variety of rainfall, topography, and vegetative cover, and limestones that are similar in mineralogy and weathering history to those in Jamaica. This paper discusses the genesis of terra rosa soils in Yucatan, and relates this to the broader problem of bauxite genesis by weathering of parent carbonate rocks.

N75-23444/3GA PC$12.00/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Tektites and Their Origin.
J. A. Okeefe. 1975, 492p NASA-TM-X-72543

Descriptors: *Chemical analysis, *Evolution (Development), *Meteoritic microstructures, *Tektites, Lunar craters, Lunar crust, Materials tests, Mechanical properties, Optical properties, Physical properties.

For abstract, see STAR 1314

PB-242 119/6GA PC$3.75/MF$2.25
Bureau of Mines, Twin Cities, Minn. Twin Cities Mining Research Center.
Rock Fragmentation by High-Frequency Fatigue.
Rept. of investigations 1975,
Patrick J. Cain, Syd S. Peng, and Egons R. Podnieks. Apr 75, 27p BuMines-RI-8020

Descriptors: *Rock mechanics, *Marble, *Granite, *Quartzites, *Rock properties, Rock tests, Fatigue life, Fatigue limit, Fatigue strength at N cycles, Stress cycle, Thermal stresses, Fatigue(Materials), Ultrasonic tests.

The fatigue-failure characteristics under high-frequency (10KHz) cyclic loading were determined for a marble, granite, and quartzite. The rock specimens were cyclicly loaded (using a high-power piezoelectric sonic transducer) at a constant strain amplitude generated by forming a longitudinal standing stress (strain) wave in the cylindrical test specimen. The number of load cycles required to fail each rock type at a given strain amplitude was determined. Also, the internal heating of the rock caused by the material damping (internal friction) was measured. Using these results the thermal strain in the rock was calculated to evaluate its contribution to fatigue failure. The specific energy required for failure was determined and possible applications of the high-frequency fatigue fragmentation process are discussed.

PB-242 121/2GA PC$3.25/MF$2.25
Bureau of Mines, Laramie, Wyo. Laramie Energy Research Center.
Properties of Utah Tar Sands-Asphalt Wash Area, P. R. Spring Deposit.
Research rept.,
L. A. Johnson, L. C. Marchant, and C. Q. Cupps. Apr 75, 17p BuMines-RI-8030
See also report dated Dec 74, PB-240 153.

Descriptors: *Bituminous sands, Drill core analysis, Porosity, Thickness, Permeability, Compressive strength, Liquid saturation, Density(Mass/volume), Utah, Statistical data, Tables(Data).
Identifiers: Asphalt Wash area(Utah), Uinta Basin.

This report presents the analysis of three cores from the Asphalt Wash area of the P.R. Spring tar sand deposit of northeastern Utah. This is the third in a series of reports giving core data from 13 cores taken in the P.R. Spring deposit by the Utah Geological and Mineral Survey in the summer of 1973. Two tar sand zones are indicated in the Asphalt Wash area. Total net thickness of the tar sand ranges from 23 to 39

feet with occurrences between 56 and 263 feet in depth. The sand has average porosity of 87.5 and 596 md respectively, and average oil saturation of 58.1 pct of pore volume.

8H. Hydrology and Limnology

E75-10308 PC$3.75/MF$2.25
Bendix Corp., Ann Arbor, Mich. Aerospace Systems Div.
Application of LANDSAT to the Surveillance and Control of Lake Eutrophication in the Great Lakes Basin.
Progress rept. Mar-May 75,
Robert H. Rogers. Jun 75, 42p BSR-4183 NASA-CR-142852
Contract NAS5-20942
Original contains color imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Indiana, Ohio, Kentucky, Michigan, Wisconsin, Bays(Topographic features), Inland waters, Great Lakes(North America), Eutrophication, Ground truth, Earth resources program, Land use, Turbidity, Water circulation, Regional planning, Data collection platforms.

The author has identified the following significant results. Preliminary results in Saginaw Bay show that processed LANDSAT data provides a synoptic view of turbidity and circulation patterns that no degree of ground monitoring can provide. Processed imagery was produced to show nine discrete categories of turbidity, as indicated by nine Secchi depths between 0.3 and 3.3 meters. Analysis of lakes near Madison, Wisconsin show that inland lake water can be categorized by LANDSAT as clear, tannin, algal, and red clay. LANDSAT's capability to inventory watershed land use was thoroughly demonstrated in the Ohio-Kentucky-Indiana regional planning area. Computer tabulations providing area covered by each of 16 land use categories were rapidly and economically produced for each of the 225 watersheds and nine counties.

PB-242 269/9GA PC$7.00/MF$2.25
Oklahoma Water Resources Board, Oklahoma City.
Salt Water Detection in the Cimarron Terrace, Oklahoma.
Ecological Research series rept. (Final).
Apr 75, 178p EPA/660/3-74-033
Grant EPA-S-800994

Descriptors: *Water pollution, *Salt water, *Aquifers, *Electrical resistance meters, *Cimarron Terrace Region(Oklahoma), Ground water, Water quality, Electrical resistivity, Accuracy, Brines, Sources, Oil fields, Hydrogeology, Water wells, Tables(Data), Oklahoma.
Identifiers: Water quality data.

The objectives of the project were to demonstrate the applicability of surface resistivity techniques to delineate salt water contamination in a shallow alluvial aquifer; to outline areas of salt water contamination in a valuable terrace aquifer; to permit safe future development; and to identify the sources of such contamination.

PB-242 304/4GA PC$7.00/MF$2.25
Washington Univ., Seattle. Coll. of Forest Resources.
Urban Storm Runoff. Puget Sound Region, Washington,
David D. Wooldridge, George M. Mack, and Jeanette Veasey. Feb 75, 186p W75-08492, OWRT-B-042-WASH(1)
Contract DI-14-31-0001-3350

Descriptors: *Surface water runoff, *Storms, *Urban areas, *Puget Sound Region, Land use, Floods, Predictions, Design, Watersheds, Washington(State), Water law, Surface waters, Flooding, Regulations, Water storage.
Identifiers: Storm water runoff, Urban hydrology, Peak discharge.

Peak storm discharge had flood flow of a 225 year storm on an intensely developed small urban watershed when other streams with lesser urbanization had usual winter runoff. Mathematical relationships which predict mean daily discharge from precipitation show storm flow yields have increased from 130 to 185% over the past decade. These increases in flow range from 0.5 to 0.9 cubic feet per second per square mile per year, based on current trends. In area inches these range from 0.6 to 1.86 inches of increased runoff from small basins. Common law of surface water rights of the State of Washington has established that owners of lower land have the right to prevent upper land owners from burdening a natural watercourse with a quantity or velocity of water beyond its capacity. Considerable progress has been made in recent years in regulation and assessment of responsibilities for control of storm runoff.

PB-242 311/9GA PC$4.75/MF$2.25
Nevada Univ., Reno. Desert Research Inst.
Non-Equilibrium Thermodynamic Treatment of Transport Processes in Ground-Water Flow.
Hydrology and water resources technical rept.,
C. L. Carnahan. May 75, 91p H-W-Pub-24 W75-08488, OWRT-B-067-NEV(2)
Contract DI-14-31-0001-4103

Descriptors: *Ground water, *Base flow, *Thermodynamic equilibrium, Chemical reactions, Dispersing, Group theory, Equations, Porous materials.
Identifiers: Path of pollutants.

The theory of non-equilibrium thermodynamics is applied to transport processes in groundwater flow systems. The theory and the manner in which it can be applied to natural processes are described. The theory is postulated to be applicable to a continuum model of porous medium in which fluxes and forces at points in the fluid phase are averaged over a representative elementary volume. Phenomenological equations appropriate to ground-water flow systems are derived to illustrate the presence of coupled phenomena in dispersive processes and simultaneous transport of heat and matter. It is proposed that phenomenological coefficents for coupled and direct dispersive processes be formed of the product of solute velocities, rather than with fluid flow velocities. Group theory is applied to resulting coefficients, and new results are obtained for the forms assumed by the coefficients in certain anisotropic media.

PB-242 344/0GA PC$4.75/MF$2.25
Idaho Univ., Moscow. Dept. of Agricultural Engineering.
Sediment Transport Through High Mountain Streams of the Idaho Batholith.
Master's thesis,
David R. Neilson. Apr 74, 91p W75-08483, OWRT-B-025-IDA(2)

Descriptors: *Bed load, *Sediment transport, *Streams, Measurement, Volume, Predictions, Aquatic animals, Mountains, Sedimentation, Theses, Idaho.
Identifiers: *Idaho Batholith, Peak discharge, *Sediment load.

The objectives were to determine the carrying capacity, allowable amounts of sediment and methods to measure levels of fine sediments of 0.25 inches or finer in mountain streams in the Idaho Batholith. The sources and the effects of the sand size sediments once they leave the mountain Batholith streams are not considered. Sediment discharge during the high water event of 1973, a year of minimal peak discharge, was insignificant. Projected transport rates using the Meyer-Peter, Muller formula, which shows good agreement with empirical data for Batholith streams, are presented. The allowable amount of fine sediments to enter these streams was determined by a sediment budget within limits established by the aquatic managers.

8I. Mining Engineering

NTIS/PS-75/540/5GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Offshore Drilling (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Guy E. Habercom, Jr. Jul 75, 121p*
Supersedes NTIS/PS-74/103.

Descriptors: *Bibliographies, *Offshore drilling, Undersea mineral deposits, Gas wells, Oil wells, Oil spills, Ocean environments, Environmental impacts, Drilling rigs, Law(Jurisprudence), Abstracts.

Drilling procedures, equipment, environmental aspects, and legal implications involved in oceanic mineral resources recovery are investigated in these Government-sponsored research reports. (Contains 116 abstracts).

NTIS/PS-75/562/9GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Mine Safety. Part 1. Fires and Explosions (A Bibliography with Abstracts).
Rept. for 1964-Jul 75,
Edward J. Lehmann. Jul 75, 86p*
See also Part 2, NTIS/PS-75/563.

Descriptors: *Bibliographies, *Coal mines, *Mine fires, *Fires, *Underground explosions, Methane, Flame propagation, Deflagration, Gas dynamics, Combustion products, Plastics, Wood, Burning rate, Combustion, Coal dust, Dust explosions, Safety engineering, Fire safety, Electric sparks.
Identifiers: *Mine safety.

The cited reports cover research on underground mine fires and explosions as well as safety and prevention measures. The primary concern is with methane and coal dust explosions. Safety barriers, dust control, combustion products, fire sensors, fire suppression, metal spark inhibition, and dust explosions are all included. (Contains 81 abstracts).

NTIS/PS-75/563/7GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Mine Safety. Part 2. Communication and Position Finding Systems (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
William E. Reed. Jul 75, 58p*
See also Part 1, NTIS/PS-75/562, and Part 3, NTIS/PS-75/564.

Descriptors: *Bibliographies, *Mines(Excavations), *Telecommunication, *Position finding, *Coal mines, Mining engineering, Rescue systems, Detection, Safety, Electromagnetic noise.
Identifiers: *Mine safety, Underground communications.

Federally-sponsored research reports are cited which cover underground mine communications and trapped miner location. The topics in-

clude operational and emergency communication systems, detection and position finding by electromagnetic and seismic means, and electromagnetic noise in mines. (Contains 53 abstracts).

NTIS/PS-75/566/0GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Mine Safety. Part 5. General Studies (A Bibliography with Abstracts).
Rept. for 1964-Jul 75,
Edward J. Lehmann. Jul 75, 126p*
Supersedes COM-74-11223. See also Part 4, NTIS/PS-75/565.

Descriptors: *Bibliographies, *Mines(Excavations), *Coal mines, *Safety engineering, Gas detectors, Mine gases, Mining equipment, Protectors, Safety devices, Mine cars, Roofs, Coal mining, Barriers, Blasting, Dust control, Coal dust.
Identifiers: *Mine safety.

This bibliography includes studies concerning blasting safety, rescue operations, toxic and flammable gas detection, safety barriers, machinery safety design, and safety techniques in excavation and tunnel supports. Excluded are reports on mine fires and explosions, occupational health, communication systems, and trapped miner location detection. These are covered in the first four parts. (Contains 121 abstracts).

PB-242 120/4GA PC$3.25/MF$2.25
Bureau of Mines, Pittsburgh, Pa. Pittsburgh Mining and Safety Research Center.
Methane in the Pittsburgh Coalbed, Greene County, Pa.
Rept. of investigations 1975,
Ann G. Kim. Apr 75, 16p BuMines-RI-8026
See also PB-237 848.

Descriptors: *Coal mining, *Methane, *Mine ventilation, Mine gases, Mining engineering, Boreholes, Drill holes, Boring, Drainage, Materials recovery, Pennsylvania.
Identifiers: Greene County(Pennsylvania), Mine safety.

Methane in coal constitutes a serious hazard in coal mining. Draining the methane in advance of mining can mitigate this hazard, conserve energy, and offer economic benefits. This Bureau of Mines report evaluates the Pittsburgh coalbed in Greene County, Pa., to determine if advance drainage is feasible.

PB-242 123/8GA PC$3.25/MF$2.25
Bureau of Mines, Pittsburgh, Pa. Pittsburgh Mining and Safety Research Center.
The Parachute Stopping - Preliminary Experiments.
Research rept.,
Fred N. Kissell, Edward D. Thimons, and Robert P. Vinson. Apr 75, 11p BuMines-TPR-90

Descriptors: *Seals(Stoppers), Mine ventilation, Tunneling(Excavation), Tunnels, Mines(Excavations), Air circulation, Fabrics, Expansion, Safety devices, Tests, Coal mines.
Identifiers: Mine safety.

A parachute-type stopping intended for changing the course of mine ventilation air during mine emergencies has been designed and tested. Some production uses are also visualized for metal mines. Preliminary tests in the laboratory and underground indicate that the parachute stopping is a workable concept, but further developmental research is required.

PB-242 127/9GA PC$3.75/MF$2.25
Bureau of Mines, Pittsburgh, Pa. Pittsburgh Mining and Safety Research Center.
Geologic Investigations of Underground Coal Mining Problems.
Research rept.,
C. M. McCulloch, P. W. Jeran, and C. D. Sullivan. Apr 75, 36p BuMines-RI-8022

Descriptors: *Coal mines, *Mine surveys, Underground surveys, Geological surveys, Geological maps, Pennsylvania, West Virginia, Oklahoma, Virginia.
Identifiers: Marianna mine 58, Lucerne mine 6, Somerset mine 60, Federal mine 2, Howe mine, Beatrice Pocahontes mine.

A series of geological surveys were completed in six coal mines in connection with a Bureau of Mines research program on methane control. The aim of these surveys was to study the overall geology of the coalbed and to use the resulting data to evaluate the influence of the geological characteristics of the coalbed on safe and efficient coal extraction. Such geologic investigations can help to alleviate many mining problems. They are in advance of mining and predict sand channels that may intersect and cut out the coal. Clay veins can be located and their trend sometimes established. Thus, the high concentration of gas and related roof problems that frequently occur in conjunction with clay veins can be anticipated. A detailed map of the rock above the coalbed can be used to determine the length of roof bolts needed to anchor in competent strata.

PB-242 488/5GA PC$4.25/MF$2.25
Texas Instruments, Inc., Dallas. Equipment Group.
Mine Air Monitor.
Final rept. 19 Jun 72-17 Jun 74,
David Collins, and Arnold Stalder. 17 Jun 74, 53p BuMines-OFR-43-75
Contract H0122044
Revision of report dated 29 Mar 74.

Descriptors: *Gas detectors, *Mine gases, Mine ventilation, Underground mining, Instrumentation, Portable equipment, Monitors, Carbon monoxide, Nitrogen dioxide, Oxygen, Electrochemistry, Transducers.

The report summarizes work performed to design and build two portable, battery-powered, breathing air monitors for the toxic gases CO and NO2 and for oxygen deficiency for use in working places in underground mines including coal mines. The device used commercially available electrochemical transducers, features audible and visual alarms with adjustable threshold levels, selectable digital readout of gas concentrations, alarm level set points, and battery condition. It can run continuously for 30 hours from batteries before recharging is necessary. This report details the design effort including electrochemical cell characterization of response versus temperature, and contains portions of operation and instruction manual.

8J. Physical Oceanography

AD-A011 411/6GA PC$5.75/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
Mediterranean Sea-Surface Temperature Analysis Program MEDSST.
S. E. Larson, A. E. Anderson, Jr., and L. I'Anson. Jan 73, 128p Rept no. EPRF-CP Note-5

Descriptors: *Mediterranean Sea, *Ocean surface, *Computer programs, *Surface temperature, Data processing, Climate, Control sequences, Real time, FORTRAN.
Identifiers: MEDSST computer program, *Ocean temperature, CDC 3100 computers.

The MEDSST program performs a synoptic sea-surface temperature analysis for the Mediterranean and was developed specifically for operational use by the U.S. Navy Fleet Weather Central (FWC) in Rota, Spain. The sea-surface temperature (SST) observations (ship reports) are input to the BTREPORT program on punched cards and the processed information is put on a history tape. These processed BT reports, in conjunction with the previous SST analyzed field and SST climatology, are analyzed on a 25 x 53 polar stereographic grid projection. The resultant SST analysis field is grid-printed and also saved on a stacked analysis history tape for reference by the next day's analysis. The analyzed SST field on the history tape can also be contour-plotted on the Varian by using the two programs GVPLOT and PLOT31V. This document describes the MEDSST program and all related subroutines in detail.

AD-A011 412/4GA PC$5.75/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
Program BTREPORT.
Computer programming note,
A. E. Anderson, Jr., and S. E. Larson. Jan 73, 126p Rept no. EPRF-CP Note-6

Descriptors: *Mediterranean Sea, *Thermoclines, *Computer programs, Ocean surface, Temperature, Ocean bottom, FORTRAN.
Identifiers: BTREPORT computer program, Ocean temperature.

This program is part of a thermal structure package developed for Fleet Weather Central, Rota, Spain and provides the capability to incorporate sea-surface temperatures and mixed-layer depth observations required by other programs in the package. The observations are extracted from unedited radio messages of the baththermograph (BT) logs received by FWC, Rota and may be a mixture of both the new log JJXX format and the old 'shipname bathy' format. BTREPORT reads the BT card deck, extracts the desired information, and stores the LAT., LONG., I,J,SST and MLD on the history tape for access by MEDMLD and MEDSST.

AD-A011 413/2GA PC$4.25/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
Mediterranean Mixed Layer Depth Analysis Program - MEDMLD.
Computer programming note,
A. E. Anderson, Jr. Feb 73, 67p Rept no. EPRF-CP Note-7

Descriptors: *Mediterranean Sea, *Thermoclines, *Computer programs, FORTRAN, Computations, Climate, Thermal properties.
Identifiers: MEDMLD computer program, CDC 3100 computers, CDC 3200 computers, Ocean temperature.

This program is part of the thermal structure package developed for Fleet Weather Central, Rota, Spain and provides the capability to analyze the mixed layer depth when used in conjunction with the rest of this package. The analysis is performed on a polar sterographic zoomed grid of the Mediterranean area with four unit coordinates to each FNWC 63 x 63 unit coordinate. Since this program and the sea-surface analysis program (MEDSST) have many subroutines in common, only those routines not already documented in the MEDSST write-up are presented here. The purpose of MEDMLD is to generate an analyzed mixed layer depth field using reports and a first guess field (MLD4) supplied by MLDZOOM.

AD-A011 415/7GA PC$3.75/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
The MLDZOOM Program.
Computer programming note,

S. Larson, and A. E. Anderson, Jr. Feb 73, 38p Rept no. EPRF-CP Note-9

Descriptors: *Computer programs, *Mediterranean Sea, *Thermoclines, Ocean surface, Ocean bottom, Wind, Climate, Computations, FORTRAN.
Identifiers: MLDZOOM computer program, *Ocean temperature.

MLDZOOM was written as part of the Ocean Thermal Structure Analysis package for Fleet Weather Central, Rota, Spain. Its primary purpose is to produce a mixed layer depth (MLD) estimate using wind wave height, change in sea surface temperature and interpolated MLD climatology.

AD-A011 481/9GA PC$3.25/MF$2.25
Scripps Institution of Oceanography La Jolla Calif
On the Sounding of Trenches,
Robert L. Fisher. 1954, 13p
Availability: Pub. in Deep-Sea Research, v2 p48-58 1954.

Descriptors: *Ocean bottom, *Deep oceans, Depth finding, Deep depth, North Pacific Ocean, South Pacific Ocean, Echo ranging, Hydrophones, High frequency, Ocean bottom topography.
Identifiers: Trenches(Marine), Tonga trench, Japan trench, Ramapo deep(Japan Trench).

During 1952-53 the Scripps Institution of Oceanography research vessels Horizon and Spencer F. Baird made extensive bathymetric investigations of the Tonga and Japan Trenches. The greatest minimum travel-time recorded from the Tonga Trench corresponds to a depth of 5,814 + or - 15 fathoms (10,633 + 0 or - 27 metres), corrected. If this value were accepted as the true depth, it would be the deepest sounding yet recorded from the Southern Hemisphere, but careful study of the records indicates that the actual maximum depth in this area if probably at least 5,900 fathoms. This measurement was made by recording the echoes from the explosion of a small charge with a hydrophone and pen oscillograph. The principal sources of error in this method are evaluated; errors in interpretation of such sonic soundings are probably many times as great as the errors in measurement. Soundings in the Japan Trench were recorded with a high-frequency echo-sounder. Results of this investigation in the Ramapo Deep indicate a maximum depth of about 5,250 fathoms (9,600 metres), corrected. (Author)

COM-75-10729/2GA PC$5.75/MF$2.25
Alaska Univ., College. Inst. of Marine Science.
Variations in the Hydrographic Structure of Prince William Sound,
Robin D. Muench, and C. Michael Schmidt.
1974, 137p IMS-R75-1, Sea Grant-75-1 NOAA-75051406
NOAA-04-3-158-75-1

Descriptors: *Oceanographic data, *Prince William Sound, Estuaries, Surface temperature, Circulation, Salinity, Mixing, Density(Mass/Volume), Seasonal variations, Deep water, Tables(Data), Graphs(Charts), Alaska.
Identifiers: Sea Grant Program.

Prince William Sound, a complex fjord-type estuarine system located off the northern Gulf of Alaska, is one of the larger North American estuarine systems not presently influenced by metropolitan activities. The study analyzes and discusses the physical oceanographic conditions in the Sound, providing information which can be used in making management decisions and planning specific research in the region. Those areas which are studied include the distribution of temperature, salinity, and density; mixing processes and circulation; deep-water renewal processes; and seasonal variations in hydrographic conditions.

TT-73-58017 PC$7.25/MF$2.25
National Science Foundation, Washington, D.C. Office of Polar Programs.
Soviet Oceanographic Expeditions,
K. K. Deryugin. 1974, 203p
Trans. of mono. Sovetskie Okeanografitseskie Ekspeditii, Leningrad, 1968. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Oceanographic data, Oceanographic surveys, Air water interactions, Marine biology, Oceanographic ships, Atlantic Ocean, Arctic Ocean, Pacific Ocean, Indian Ocean, Polar regions, Translations, USSR.

The report reviews research performed on expeditions to the Arctic Ocean, Atlantic Ocean, Pacific Ocean, Indian Ocean and Polar regions.

8K. Seismology

AD-A011 174/0GA PC$3.25/MF$2.25
Texas Univ At Dallas Geosciences Div
Unified Geophysical Study of Seismic and Electrical Properties of the Crust of the United States.
Final rept.,
Mark Landisman. Sep 74, 22p
Contract N00014-67-A-0310-0001, Grant NSF-GA-25683
Sponsored in part by Grant NSF-GA-37199. Report on First Results from Electrical and Seismic Studies of Low Resistivity, Low Velocity Material beneath Eastern Colorado.

Descriptors: *Earth crust, *Lithosphere, Resistance, Velocity, Tectonics, Seismic reflection, Electrical conductivity, Geomagnetism, Colorado.
Identifiers: Anton(Colorado).

This report is concerned primarily with the observation, reduction, and interpretation of an outstanding set of magnetotelluric data observed near Anton, in eastern Colorado, close to the U.S.G.S. seismic refraction line.

AD-A011 387/8GA PC$3.25/MF$2.25
Alaska Univ College Geophysical Inst
Travel-Time Relations for the Upper Mantle P-Wave Phases from Central Alaskan Data,
N. N. Biswas, and B. Bhattacharya. 7 Dec 73, 13p Rept no. UAG-Contrib-A438 AFOSR-TR-75-0693
Contract F44620-73-C-0053, ARPA Order-1827
Availability: Pub. in Bulletin of the Seismological Society of America, v64 n6 p1953-1965 Dec 74.

Descriptors: *Seismic waves, Earth mantle, Alaska, Epicenters, Earthquakes, Velocity, Lithosphere, North Pacific Ocean, Submarine troughs, Faults(Geology), Structural geology, Delay, Underground explosions, Nuclear explosions, Aleutian Islands, Nevada, Reprints.
Identifiers: Primary waves, Upper mantle, Travel time.

This paper describes the travel-time relations for the upper mantle P-wave phases in the epicentral distance range of 700 to 4500 km. The short-period data analyzed were from underground nuclear explosions in central Aleutian and Nevada regions and from earthquakes located along the north Pacific seismic belts; the data were recorded by the central Alaskan seismic network. The observations could be explained by three linear relations: the first extends from 700 to 1900 km with apparent velocity of 8.29 km/sec, the second is between 1900 and 2850 km with apparent velocity of 10.39 km/sec and the third extends from 2850 to 4500 km with apparent velocity 12.58 km/sec. In the epicentral distance range of 1900 to 2600 km, the first p-wave arrivals from earthquakes in the Aleutian area were found systematically late by 3 to 4 sec compared with those from central Aleutian underground nuclear explosions. This discrepancy in travel times has been interpreted as due to mislocations and errors in origin time for earthquakes in the above area. Also, the well-known 400- and 600-km discontinuities in the upper mantle have been correlated with the sharp changes in travel-time gradients at 1900 and 2850 km, respectively. (Author)

AD-A011 655/8GA PC$3.75/MF$2.25
Draper (Charles Stark) Lab Inc Cambridge Mass
Field Test of a Three-Channel Seismic Event Discriminator.
Technical rept. (Final),
Sheldon W. Buck, David S. Burns, and Lawrence J. Freier. Mar 75, 32p Rept no. R-864 AFOSR-TR-75-0676
Contract F44620-74-C-0053, ARPA Order-2441

Descriptors: *Seismic data, *Data processing, *Discriminators, Seismometers, Field tests, Calibration, Signal to noise ratio, Breadboard models, Circuits, Diagrams, Low pass filters, Recording systems, Earth movement, Sensitivity, Massachusetts.
Identifiers: *Seismic discrimination, Harvard(Massachusetts).

A practical three-channel seismic-event-discriminator breadboard was employed at the Harvard College Observatory located in Harvard, Mass. to monitor, in real time, three short-period seismometers. The major objective for placing this breadboard system in the field was to demonstrate that preprocessing of seismic data on-site (thereby reducing recording and transmitting requirements) was a viable and workable concept. Background information pertaining to the event-discriminator test plan; experimental test installation including the seismometer set up, interfaces and recording equipment; interface circuits, and calibration procedures and test results of the seismometers is provided. A summary and interpretation of in-field testing data is presented.

PB-242 262/4GA PC$8.75/MF$2.25
California Inst. of Tech., Pasadena. Earthquake Engineering Research Lab.
Strong Motion Earthquake Accelerograms Digitized and Plotted Data. Volume I. Uncorrected Accelerograms. Part U. Accelerograms IU294 Through IU313. Accelerograms from the San Fernando, California, Earthquake of February 9, 1971,
A. G. Brady, and D. E. Hudson. Feb 75, 299p
EERL-73-26
Grant NSF-GI-28098
See also PB-242 433.

Descriptors: *Earthquakes, *Seismic waves, *Dynamic structural analysis, Data processing, Accelerometers, Power spectra, Spectrum analysis, Buildings, Structures, Dynamic response, Digital recording, California, Washington(State), Montana.
Identifiers: *Earthquake engineering, *Ground motion, San Fernando earthquake.

The first set of twenty uncorrected digitized earthquake accelerograms was published in July 1969 as Volume I, Part A, of the present series. That volume also contained introductory material and background information describing the methods used, accuracies, etc., which should be referred to by all users of the data. The 1971 San Fernando earthquake provided records of sufficient importance that the original plan was interrupted after two parts and Parts C through S contained the San Fernando earthquake accelerograms. This issue contains California records from Ferndale,

Santa Barbara, Hollister, Tehachapi, San Jose, and Taft, together with records from Helena, Montana, and Seattle, Washington, during the years 1934 to 1967. Further records from some of these sites have appeared in other parts of the series.

PB-242 433/1GA PC$8.50/MF$2.25
California Inst. of Tech., Pasadena. Earthquake Engineering Research Lab.
Strong-Motion Earthquake Accelerograms Digitized and Plotted Data. Volume II. Corrected Accelerograms and Integrated Ground Velocity and Displacement Curves. Part T. Accelerograms IIT274 Through IIT293,
M. D. Trifunac, A. G. Brady, and D. E. Hudson.
Feb 75, 264p EERL-75-50
Grant NSF-GI-28098
See also PB-241 552.

Descriptors: *Earthquakes, *Seismic waves, *Dynamic structural analysis, Data processing, Accelerometers, Power spectra, Spectrum analysis, Buildings, Structures, Dynamic response, Digital recording, California, Imperial valley.
Identifiers: *Earthquake engineering, *Ground motion, San Fernando earthquake.

The first set of twenty corrected earthquake accelerograms was published in September 1971, as Volume II, Part A, Report No. EERL 71-50, the first report of the Volume II series. That issue also contained introductory material and background information describing the types of corrections used. The corresponding uncorrected data appeared earlier in Volume I, Part A, Report No. EERL 70-20. Both of these reports, containing references related to the records themselves and the various procedures, should be referred to by all users of the data. This issue, Volume II, Part T, Report No. EERL 75-50, contains records from the El Centro, California, site in the basement of the Imperial Valley Irrigation District District substation, from 1938 to 1966 including nine groups of aftershocks of the May 18, 1940, Imperial Valley earthquake.

8L. Snow, Ice, and Permafrost

AD-A011 190/6GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
The Formation of Brine Drainage Features in Young Sea Ice.
Technical rept.,
Lars Ingolf Eide, and Seelye Martin. 14 Mar 74, 20p Rept nos. TR-30, Contrib-311
Contract N00014-67-A-0103-0007
Availability: Pub. in Jnl. of Glaciology, v14 n70 p137-154 1975.

Descriptors: *Sea ice, *Desalination, Brines, Drainage, Channels(Waterways), Laboratory tests, Growth(General), Oscillation, Flow rate, Dyes, Reprints.

Laboratory experiments on the growth of sea ice in a very thin plastic tank filled with salt water, cooled from above and insulated with thermopane, clearly show the formation and development of brine drainage channels. The sea-water freezing cell is 0.3 cm thick by 35 cm wide by 50 cm deep; the thermopane insulation permits the ice interior to be photographed. Experimentally, we observe that vertical channels with diameters of 1 to 3 mm and associated smaller feeder channels extend throughout the ice sheet. Close examination of the brine channels show that their diameter at the icewater interface is much narrower than higher up in the ice, so that the channel has a 'neck' at the interface. Further, oscillations occur in the brine channels, in that brine flows out of the channel followed by a flow of sea-water up into the channel. Theoretically, a qualitative theory based on the difference in pressure head between the brine inside the ice and the seawater provides a consistent explanation for the formation of the channels, and the onset of a convective instability explains the existence of the neck. Finally, an analysis based on the presence of the brine-channel neck provides an explanation for the observed oscillations. (Author)

AD-A011 247/4GA PC$3.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Holographic Technique for Measurements of Strain,
R. H. Berger, S. J. Marshall, R. H. Munis, and M. E. Fourney. May 75, 325p Rept no. CRREL-SR-227

Descriptors: *Sea ice, *Strain(Mechanics), *Holography, Deformation, Measurement, Interferometry, Test methods, Modulus of elasticity, Poisson ratio.
Identifiers: *Interferometric holography.

An experimental program was carried out to see if holographic interferometry could be used to determine Young's modulus and Poisson's ratio of ice using the ring test. Spurious rigid body deflections of up to 0.5 microinch were found when the sample was compressed. These motions are of such magnitude that they will affect the accuracy of the bore gauge measurements of ice strength. The technique most suited to measurements of the deformation of the ice ring is speckle interferometry. This technique is most sensitive to motions of the magnitude found when using the ring test on ice and it allows measurement of motion in each of the three orthogonal directions separately so that Young's modulus and Poisson's ratio may be obtained easily.

AD-A011 249/0GA PC$3.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Use of Side-Looking Airborne Radar to Determine Lake Depth on the Alaskan North Slope,
P. Sellmann, W. F. Weeks, and W. J. Campbell. May 75, 14p Rept no. CRREL-SR-230

Descriptors: *Ice, *Lakes, *Alaska, Thickness, Depth, Radar images, Side looking radar, Airborne, Brackish water, Fresh water, Classification, Coastal regions.
Identifiers: Ice cover, Remote sensing, Lake ice.

Side-looking airborne radar (SLAR) imagery obtained in April-May 1974 from the North Slope of Alaska between Barrow and Harrison Bay indicates that tundra lakes can be separated into two classes based on the strength of the radar returns. Correlations between the areal patterns of the returns, limited ground observations on lake depths, and information obtained from ERTS imagery strongly suggest that freshwater lakes giving weak returns are frozen completely to the bottom while lakes giving strong returns are not. Brackish lakes also give weak returns even when they are not completely frozen. This is presumably the result of the brine present in the lower portion of the ice cover limiting the penetration of the X-band radiation into the ice. Although the physical cause of the differences in radar backscatter has not been identified, several possibilities are discussed. The ability to rapidly and easily separate the tundra lakes into these two classes via SLAR should be useful in a wide variety of different problems.

JPRS-64980 PC$3.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Soviet Antarctic Information Bulletin. Number 90, 1975,
V. V. Evseev. 11 Jun 75, 31p
Trans. of Sovetskaya Antarkticheskaya Ekspeditsiya. Informatsionnyi Byulleten (USSR) n90 p14-17, 29-34, 59-60, 61-64, 102-104, 105-109 1975.

Descriptors: *Sea ice, *Antarctic regions, Technical reports, Glaciers, Radio transmission, Photogrammetry, Remote sensing, Meteorological satellites, Translations, USSR.

Contents:
- Antarctic Sea ice determined using satellite observations;
- Mechanism of propagation of short radio waves between Irkutsk and Bellinsgauzen Station in Antarctica;
- Photogrammetric studies of a group of scientists of the German Democratic Republic on the seventeenth Soviet Antarctic expedition;
- Glaciological-Geodetic investigations on Hays glacier in 1972;
- Experience in using satellite data in traversing Antarctic drift ice during the 1970-1971 navigation season;
- Observations using French electronic equipment and the EOLE satellite.

TT-70-59126 PC$17.25/MF$2.25
National Science Foundation, Washington, D.C.
Glaciation of the Novaya Zemlya (Oledenenie Novoe Zemli),
O. P. Chizhov, and V. S. Koryakin. 1974, 798p
Trans. from Glyatsiologiya: Sbornik Statei (USSR) n18 1968, by Geti Saad. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Glaciation, *Glacial geology, Glaciology, Climate, Solar radiation, Heat budget, Snow, Melting, Storms, Glaciers, Translations, USSR.
Identifiers: International geophysical year.

The Novaya Zemlya-expedition of the Institute of Geography, the USSR worked during 1957-1959 in the area of Russian Harbor in the Northern island of New Land under the program of International Geophysical year (IGY). The present book is a collective publication of the participants of this expedition. Among the chapters, written on the basis of the data of investigations carried out by the expedition, are the chapters on the radiating regime and thermal balance of the surface (iv), feeding of glaciers (v), melting of snow (vi), temperature of upper layers of glacier sheet (vii), areas of ice formation (viii), movement (ix), and balance of ice mass (xiii).

TT-72-52012 PC$7.50/MF$2.25
National Science Foundation, Washington, D.C. Office of Polar Programs.
The Antarctic Committee Reports 1969,
V. A. Bugaev. 1975, 242p
Trans. from Antarktika. Doklady Komissii, Moscow, 1971 by Y. V. Kathavate. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Atmospheric sounding, *Glaciers, *Meteorological data, *Geology, *Antarctic regions, Cosmic rays, Ionosphere, Snow, Earth crust, Ice, Geomorphology, Geophysics, Acclimatization, Blood, Translations, USSR.

The collection contains articles on the most important problems of the study of the Antarctic. The results of investigations on cosmic rays and the ionosphere are presented in these articles. A number of articles are devoted to geology and geophysics. Special attention has been paid to hydrometeorological investigations. New data on glaciology, microbiology and medicine are given.

TT-72-58016 PC$8.50/MF$2.25
National Science Foundation, Washington, D.C. Office of Polar Programs.
Soviet Antarctic Expedition (14th),
N. A. Kornilova. 1974, 254p

Trans. from Sovetskaya Antarkticheskaya Ekspeditsiya. Trudy, v57 1971. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Ice, *Marine geophysics, *Oceanographic data, *Meteorological data, *Antarctic Regions, Glaciers, Echo sounding, Oceanographic surveys, Marine geology, Exploration, Sea ice, Weather observations, Translations, USSR.

The scientific work of the 14th Soviet Antarctic expedition was carried out through 1968/69. The program of the expedition seasonal work included the performance of a wide complex of scientific research on the continent and in the Antarctic waters. The present volume consists of two parts. The first part includes the general description of the expedition, and the description of the scientific observations carried out on board the expeditional ships and on the continent. The results of the oceanographic work, radioglacial study, and the geologic work are considered in detail. The second part contains some definite results of this scientific work.

TT-74-53004 PC$13.00/MF$2.25
National Science Foundation, Washington, D.C. Office of Polar Programs.
The Antarctic - Committee Reports No. 11.
1974, 560p
Trans. of Antarktika (USSR) n11 224p 1972 by Geti Saad. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Antarctic regions, *Geologic investigations, *Glaciers, Technical reports, Abstracts, Glaciation, Acclimatization, Magnetic storms, Gravity, Pathophysiology, Blood, Translations, USSR.

A partial listing of papers include the following: The experimental studies of micropulsation on geomagnetic poles; The dynamics of the circumpolar boundary of the oval of the glow during the development of an auroral-sub-storm; The regional metamorphism of the crystalline foundation of the Antarctic platform; Some of the features of the structures of the south ocean and Antarctica from gravimetric data; The glaciation features in Antarctica and its paleogeographical importance; The origin of the moraine on the shelf glacier and on the shores of the bay of McMurdo (Victoria Land); Modeling major fluctuations in the earth's climate and glaciation during anthropogenesis; Radioactive isotopes in the ice cover of Antarctica; The main aspects of the psychological investigation in Antarctica.

8M. Soil Mechanics

AD-A011 459/5GA PC$5.25/MF$2.25
Oklahoma Univ Norman
Rheological Properties of Frozen Soils.
Final rept.,
Robert G. Rein, Jr., and Cedomir M. Sliepcevich. 28 Feb 75, 122p Rept no. 1827-1978-FR-1 ARO-10302.2-EN
Grants DAHC04-74-G-0117, DA-ARO-D-31-124-72-G0117

Descriptors: *Soils, *Creep tests, *Deformation, Rheology, Permafrost, Loads(Forces), Sand, Silt, Stresses, Graphs, Particle size, Strain rate, Compressive properties, Soil mechanics, Numerical analysis, Tables(Data).
Identifiers: *Frozen soils, Creep strength, Void ratio, Creep rate.

Results for creep tests during uniaxial, unconfined compressive loading of a frozen silt at -9C, a frozen sand at -8.5C and two other frozen sands at -9C are presented. Results of creep recovery tests on a frozen silt and a frozen sand are also reported. In order to elucidate soil behavior for modeling long-term creep deformation, the data are analyzed in terms of stress-strain behavior at constant times. The stress-strain behavior prior to tertiary creep is best represented by bisectional relations, instead of the usual continuous relations. Equations are presented for modeling the creep behavior for a single application of a constant load.

PB-241 917/4GA PC$7.00/MF$2.25
Auburn Univ., Ala. Dept. of Civil Engineering.
The Behavior of Statistically Heterogeneous Excavated Earth Slopes.
Supplemental rept. Dec 72-Mar 74 (Final),
George E. Ramey. Jun 74, 181p HPR-67-B
See also PB-224 916. Prepared in cooperation with Alabama State Highway Dept., Montgomery. Bureau of Research and Development.

Descriptors: *Highways, *Slopes, *Revetments, *Soil mechanics, Soil properties, Computerized simulation, Computer programs, Alabama, FORTRAN.
Identifiers: Finite element analysis, DOT/4BZ/BA, DOT/4CZ/CA, FORTRAN 4 programming language.

The computer program which was originally developed for evaluating the behavior of earth slopes has been modified, extended, and further tested and documented. The program can now handle soil excavation problems, embankment problems, and in-plane elasticity problems. The constituent materials in each of these problem types may be layered in horizontal layers and taken as deterministic or statistically heterogeneous. The program uses an incremental procedure in the simulation of earthwork excavation or filling and thereby solves nonlinear problems in a piecewise linear manner.

PB-242 419/0GA PC$3.75/MF$2.25
Michigan State Univ., East Lansing. Dept. of Civil Engineering.
Cyclic Triaxial Test Equipment to Evaluate Dynamic Properties of Frozen Soils.
Final rept.,
Ted S. Vinson. Mar 75, 43p MSU-CE-75-1
Grant NSF-GK-37439

Descriptors: *Frozen soils, *Structures, Interactions, Permafrost, Soil properties, Alaska, Triaxial tests, Soil mechanics, Earthquakes.
Identifiers: *Earthquake engineering, *Soil structure interactions.

To establish the response interaction between a soil deposit and a structure during an earthquake, two soil properties are required: (1) the dynamic shear modulus, and (2) the damping factor. For unfrozen soils these properties have been determined by several investigators, and design equations and curves to establish the properties for representative soil types have been developed. For frozen soils, only limited work has been done to evaluate these properties in a test range that would not be useful in earthquake response analyses. Thus, an engineer confronted with a seismic design problem involving frozen soils cannot use existing analytic techniques to predict response interactions because the necessary properties of frozen soils have not been determined. The results of a research program to (1) develop test equipment to evaluate the shear moduli and damping factors of frozen soils for use in ground response analyses during earthquakes, and (2) develop a research plan to investigate parameters that might influence shear moduli and damping factors of frozen soils are presented.

PB-242 450/5GA PC$3.25/MF$2.25
Sydney Univ. (Australia). Civil Engineering Labs.
Effect of Seepage on Embankment Deformations Due to Water Loading.
Research rept.,
J. P. Carter, H. G. Poulos, and J. R. Booker. Dec 74, 19p R-256

Descriptors: *Embankments, *Pore pressure, *Deformation, Seepage, Drainage, Dams, Fluid flow, Australia.
Identifiers: Finite element analysis.

A finite element analysis is made of the movements in an embankment due to water loading, taking account of seepage through the embankment. The effects on deformations of drainage within the embankment and of a central core are investigated for an embankment resting on a rigid base. It is found that the long-term deformations due to water loading may be considerably affected by the pattern of steady state flow, and hence by the provision of drainage within the embankment. Larger horizontal movements are developed when seepage occurs than if an impermeable membrane exists on the upstream face. The modulus of the core relative to the shells also has a significant effect on movements.

PB-242 556/9GA PC$3.75/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Research.
Development and Evaluation of Chemical Soil Stabilizers.
Final rept.,
Earl B. Kinter. Mar 75, 30p FHWA/RD-75-17

Descriptors: *Soil stabilization, Chemical industry, Scientific research, Chemical compounds, Soil cements, Tests.
Identifiers: Test methods, DOT/4BZ/BA.

This report documents the results of a 20-year cooperative effort between the Federal Highway Administration (FHWA) and the chemical industry to develop and evaluate chemicals for soil stabilization. All evaluated substances were either ineffective or only marginally effective as principal or broad-scale soil stabilizers; however, some were suitable for improvement of local soils or for short-term correction of adverse soil conditions. Results are briefly discussed.

8N. Terrestrial Magnetism

AD-A011 192/2GA PC$3.25/MF$2.25
Woods Hole Oceanographic Institution Mass
Counter-Clockwise Motion of Paleomagnetic Directions 24000 Years Ago at Mono Lake California.
Technical rept.,
Charles R. Denham. 4 Apr 72, 16p Rept nos. WHOI-75-31, WHOI-Contrib-3439
Contract N00014-66-C-0241
Availability: Pub in Jnl. of Geomagnetism and Geoelectricity, 26 p487-498 1974.

Descriptors: *Geomagnetism, California, History, Directional, Drift, Dipole moments, Reprints.
Identifiers: *Paleomagnetism, Quaternary(Geology).

Paleomagnetic directions from two sites at Mono Lake, California, 24000 years ago traced out a well-defined counterclockwise loop 25 deg in diameter. Major features of the loop can be explained by an inward directed radial dipole located at 0.5 Earth's radius, drifting eastward along a path 15 deg south of Mono Lake. Its longitudinal velocity was 0.10-0.19 deg/yr and its strength was 0.12-0.21 relative to the Earth's main dipole moment. The life-span of this perturbing source probably was similar to the period of the magnetic loop, about 850 years. (Author)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A011 121/1GA PC-GPO/MF$2.25-NTIS
National Bureau of Standards Washington D C Electronic Technology Div
Semiconductor Measurement Technology: Quarterly Report July 1 to September 30, 1974,
W. Murray Bullis. May 75, 59p Rept no. NSB-Special Pub-400-12
DARPA Order-2397
Sponsored in part by Defense Nuclear Agency, Washington, D.C., Defense Advanced Research Projects Agency, Arlington, Va. Strategic Systems Project Office (Navy), Washington, D.C.
Availability: Paper copy available from GPO as C13.10:400-12.

Descriptors: *Semiconductors, *Semiconductor devices, *Quality control, Test methods, Semiconductor doping, Electrical resistance, Crystal defects, Impurities, Silicon, Capacitors, Thin films, Oxides, X ray spectroscopy, Charge coupled devices, Epitaxial growth, Thickness, Electron probes, Thermal properties, Nondestructive testing, Hermetic seals, Mass spectroscopy, Ultrasonic tests, Hall effect.

This quarterly progress report describes NBS activities directed toward the development of methods of measurement for semiconductor materials, process control, and devices. The emphasis is on silicon device technologies. Principal accomplishments during this reporting period include (1) completion of Hall effect measurements to determine activation energies of the gold donor and acceptor levels in silicon; (2) successful direct measurement of fast interface state density with the circular CCD test structure; and (3) demonstration of the feasibility of the use of acoustic emission as a nondestructive means for testing individual beam-lead bonds.

AD-A011 128/6GA PC$3.25/MF$2.25
Office of Naval Research London (England)
Surface Effects on Semiconductor Devices.
Conference rept.,
Roy F. Potter. 6 May 75, 13p Rept no. ONRL-C-9-75

Descriptors: *Semiconductor devices, *Field effect transistors, *Surface properties, Schottky barrier devices, Ionizing radiation, Impurities, Defects(Materials), Silicon, Charge coupled devices, Band theory of solids, Meetings, Great Britain.
Identifiers: *Metal insulator semiconductors, Density of states.

Surface Effects on Semiconductor Devices was the topic of a one-day meeting sponsored by the Thin Films and Surfaces Group of the Institute of Physics, London. This report gives a brief outline of metal-insulator-semiconductor (MIS) relationships involving surface state potentials and densities. This is followed by a brief outline of the papers presented covering such topics as surface states, densities of states, effects of impurities, structural defects, and the impact of these effects on device physics, as well as methods for measuring, altering or controlling these effects. Most systems were based on silicon technology, but some III-V and II-VI semiconductor-systems were described. Titles and authors are listed.

AD-A011 219/3GA PC$3.75/MF$2.25
Army Electronics Command Fort Monmouth N J
Spectral Studies on Germanium Pin-Photovoltaic Cells for Thermophotovoltaic Conversion.
Technical rept.,
E. Kittl, and G. Guazzoni. May 75, 38p Rept no. ECOM-4324

Descriptors: *Photoconductivity, *Semiconductor devices, Photovoltaic effect, Semiconductor junctions, Germanium, Test methods, Silicon dioxide, Erbium compounds, Oxides, Computer printouts.
Identifiers: *Photovoltaic cells, *Thermophotovoltaic converters.

The results of an experimental investigation on a newly-developed germanium PIN-photovoltaic cell are reported, covering measured data on the spectral response of this cell. Also reported are experimental data on the optical surface reflectance and an analysis of its influence on the true spectral response of the cell. Measurements of the cell's output performance are reported for three different sources of chromatic radiation. These results are then compared to theoretical expectations derived from a computer analysis.

AD-A011 223/5GA PC$4.75/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Development and Evaluation of Repairs for EMP Leaks in Conduit Systems.
Final rept.,
D. J. Leverenz, R. G. McCormack, and P. H. Nielsen. Apr 75, 78p Rept no. CERL-TR-C-17

Descriptors: *Pipes, *Repair, *Electromagnetic shielding, Electromagnetic pulses, Leakage, Antimissile defense systems, Pipe fittings, Couplings.
Identifiers: Safeguard antiballistic missile systems.

The report discusses the development and evaluation of repairs for EMP leaks in conduit systems at the SAFEGUARD site. Repairs for 4-in. explosion-proof conduit unions, communications cable-gripper boxes, and non-RFI tight flexible conduit are studied.

AD-A011 225/0GA PC$3.25/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Results of RFI Testing of Safeguard Flexible Tunnel Section.
Final rept.,
D. J. Leverenz, R. G. McCormack, and P. H. Nielsen. May 75, 24p Rept no. CERL-TR-C-16

Descriptors: *Electromagnetic shielding, Tunnels, Flexible structures, Antimissile defense systems, Tests, Nuclear explosion damage, Electromagnetic pulses.
Identifiers: Safeguard antiballistic missile systems.

The report discusses results of the RFI shielding-effectiveness testing of a portion of the flexible tunnel section used for joining the equipment tunnels to the linear plate of the SAFEGUARD shielded enclosures. Test results are presented for several modifications to the tunnel section, including the mounting configuration to be used on site. These results indicate that, for most configurations, the shielding effectiveness of the tunnel section does meet the SAFEGUARD EMP specifications. Thus, the choise of configuration and material can be selected for construction convenience.

AD-A011 320/9GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
p-n Junction PbS Sub 1-x Se Sub x Photodiodes Fabricated by Se(+) Ion Implantation.
Journal article,
Joseph P. Donnelly, and Theodore C. Harman . 13 Jun 74, 4p Rept no. JA-4402 ESD-TR-75-158
Contract F19628-73-C-0002
Availability: Pub. in Solid-State Electronics, v18 p288-290 1975.

Descriptors: *Photodiodes, *Ion implantation, Semiconductor junctions, Layers, Infrared spectra, Fabrication, Annealing, Polishes, Reprints.

PbS(1-x)Se(x) is a mixed IV-VI semiconductor which shows promise of being useful as a photodetector in the 3-5 micrometers region of the infrared spectrum at temperatures above 77 K. In this note, we report the use of Se(+) ion implantation to convert layers of n-type PbS(0.63)Se(0.37) into p-type material and present some results on photodiodes fabricated by this technique. (Author)

AD-A011 324/1GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Submillimeter Heterodyne Detection and Harmonic Mixing Using Schottky Diodes.
Journal article,
Harold R. Fetterman, Peter E. Tannenwald, Hays Penfield, Brian J. Clifton, and Christopher D. Parker. 18 Jul 74, 4p Rept no. JA-4422 ESD-TR-75-160
Contract F19628-73-C-0002
Availability: Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-22 n12 pt1 p1013-1015 Dec 74.

Descriptors: *Schottky barrier devices, *Semiconductor diodes, *Heterodyning, Submillimeter waves, Lasers, Optical pumping, Carcinotrons, Harmonics, Reprints.
Identifiers: Local oscillators.

Schottky diodes have been used for submillimeter heterodyne detection and harmonic mixing. Using a carcinotron local oscillator at 890 micrometers, sensitive detectors of optically pumped lasers have been demonstrated up to fifth harmonic mixing at 1757.5 GHz. The measured noise equivalent power (NEP) in fundamenta mixing is approximately 10 to the minus 16th power W/Hz. (Author)

AD-A011 335/7GA PC$3.25/MF$2.25
Teledyne Mec Palo Alto Calif
Production Engineering Measure for Solid-State Microwave Acoustic Delay Lines (Bulk Waves).
General rept. on Step 2,
E. K. Kirchner, R. D. Merkley, and J. R. Yaeger. Oct 74, 17p
Contract DAAB05-71-C-2621

Descriptors: *Acoustic delay lines, Production engineering, Solid state electronics, Microwave equipment.
Identifiers: *Production engineering measures, Microwave acoustics.

The object of the investigation was to establish a production capability for microwave acoustic delay lines for the purpose of meeting estimated military needs for a period of two years after completion of the contract, and to establish a base and plans which may be used to meet expanded requirements. This is a General Report on Step II in accordance with paragraph 3.2 and paragraph 3.8 of ECIPPR No. 15, dated 1 August 1970 covering the planning to expand the delay device production rate from 500 to 5000 devices per month.

AD-A011 336/5GA PC$4.75/MF$2.25
Teledyne Mec Palo Alto Calif
Production Engineering Measure for Solid-State Microwave Acoustic Delay Lines (Bulk Waves).
Final engineering rept. Jan 71-Feb 74,

E. K. Kirchner, R. D. Merkley, and J. R. Yaeger.
Oct 74, 100p
Contract DAAB05-71-C-2621
See also report dated Oct 74, AD-A011 335.

Descriptors: *Acoustic delay lines, Production engineering, Solid state electronics, Microwave equipment.
Identifiers: *Production engineering measures, Microwave acoustics.

A production capability was established for Solid State Microwave Acoustic Delay Devices (Bulk Wave) which can withstand 15 kg shock. The manufacturing techniques emphasize fabrication of microwave acoustic delay lines which are rugged, reliable, reproducible, small, lightweight, suitable for missile and projectile-fuzing airborne systems, and producible at low cost. The report describes the bulk-wave delay device and the effort directed toward establishing large-quantity production methods for the manufacturing of a high-shock model of the acoustic bulk-wave delay device. A physical description of the device is given, analytical aspects are presented, performance and use are discussed, the theory of operation is presented, and materials and processes are described.

AD-A011 337/3GA PC$3.75/MF$2.25
Stanford Univ Calif Stanford Electronics Labs
Tin Oxide and Related Oxides with Regard to Cold Cathodes.
Semi annual rept. through 31 Mar 75,
W. E. Spicer, and R. A. Powell. 31 Mar 75, 36p
ARO-12514.1-P
Contract DAHC04-74-C-0022

Descriptors: Cathodes(Electron tubes), Tin compounds, Oxides, Cold cathode tubes, Electron emission, Thin films, Ultraviolet spectroscopy, Temperature, Chemisorption, Surface properties, Oxygen, Hydrogen, Zinc compounds.
Identifiers: *Cold cathodes, *Tin oxides, Zinc oxides.

Previous results indicate that SnO2 films, when suitably activated, make highly interesting, low-voltage (electron emission for voltages approximately = or > 2 volts) sources of electrons, i.e., cold-cathodes. However, relatively little basic research has been done on SnO2 and even less is known about its surface or the mechanism for cold-cathode emission. The authors have undertaken a preliminary study to investigate SnO2 and the processes which occur during activation using Ultraviolet Photoemission Spectroscopy (UPS) as their primary tool. Preliminary studies of O2 and H2 chemisorption on the closely related oxide, ZnO, have also been performed.

AD-A011 345/6GA PC$5.25/MF$2.25
Hughes Aircraft Co Fullerton Calif Ground Systems Group
Acoustic Multistrip Device Techniques.
Final rept. 1 Jul 73-1 Apr 75,
C. W. Chapman, and T. W. Bristol. Jun 75, 107p
Rept no. FR-75-14-333 ECOM-73-0276-F
Contract DAAB07-73-C-0276
See also report dated Jun 75, AD-784 241.

Descriptors: *Couplers, Directional, Acoustic equipment, Acoustic delay lines, Acoustic waves, Surface waves, Strip transmission lines.
Identifiers: Acoustic surface waves.

The report describes the results of a study of acoustic multistrip coupler (MSC) devices and techniques. A generalized, normal mode field model was developed which successfully predicts the transfer characteristics of multistrip couplers of arbitrary geometrical and material properties. When applied to MSC components requiring fractional transfer efficiency, especially the -3db coupler, it was found that the response characteristics could be conveniently modified by varying the stripe spacings in each track of the coupler. Specifically, fractional efficiency couplers with broad, symmetrical passbands were predicted and demonstrated experimentally. A technique for minimizing radiation losses in the interconnection regions of MSC components by machining a cavity in the piezoelectric substrate under the interconnection region and replacing it with a non-piezoelectric filler was also investigated, but it was unsuccessful primarily due to the nonuniformity of filler and substrate material thermal expansion coefficients.

AD-A011 419/9GA PC$4.25/MF$2.25
Texas Instruments Inc Dallas
Techniques for Screening Bipolar Transistor Degradation Due to Ionizing Radiation.
Final rept. 21 Mar 73-21 Jul 74,
W. C. Bruncke, J. S. Crabbe, G. G. Hopkins, J. A. Lipman, and D. J. Manus. Nov 74, 62p Rept no. TI-03-74-33 NAD-CR-TR/7024/C74/121
Contract N00164-73-C-0420

Descriptors: *Bipolar transistors, *Radiation effects, Test methods, Ionizing radiation, Electron microscopy, Junction transistors, Hardness, Silicon, Silicon dioxide, Semiconductor junctions, Test equipment, Metal oxide semiconductors, MOSFET semiconductors, Gamma rays.
Identifiers: Scanning electron microscopy.

Two methods for screening bipolar parameter degradation due to exposure to ionizing radiation were explored. These were: the use of a scanning electron microscope (SEM) as a controlled simulator of a Co60 source irradiation and the use of surface sensitive test devices to assess the potential hardness of bipolar oxides. The goal was the development of screening techniques which could be applied in a production environment to evaluate hardness to ionizing radiation while the devices were in slice form. The technique of using the SEM as a simulator for a Co60 source, delivering a total ionizing dose, was shown to be feasible. The second screening method involved the design and implementation of a test bar which placed a number of experimental devices on a common die with two p-n-p transistors. The structures on the test bar which were to characterize the oxides and the Si-SiO2 interface of the transistor pair included dated diodes, a p-n-p tetrode, MOS capacitors, and an N-channel MOSFET. Pre-irradiation characterization of the oxides was explored as a measure of post-irradiation degradation of the p-n-p transistors. The data presented here shows only limited success in the use of this method as a screen.

AD-A011 475/1GA PC$3.25/MF$2.25
Dayton Univ Ohio Dept of Physics
Electron Damage in In2Te3 - A Defect Tetrahedral Semiconductor.
Journal article,
Hilmer Swenson, D. R. Locker, J. M. Meese, and J. C. Manthuruthil. 1974. 8p ARL-75-0116
Contract F33615-71-C-1877
Availability: Pub. in IEEE Transactions on Nuclear Science, vNS-21 n4 p40-46 Dec 74.

Descriptors: *Indium alloys, *Tellurium alloys, *Semiconductors, *Crystal defects, Tellurides, Electron irradiation, Reprints.
Identifiers: Indium sesquitelluride.

Indium sesquitelluride (In2Te3) is typical of a large class of defect semiconductors which are tetrahedrally bonded but which possess room temperature vacancy concentrations of the order of 5.5x10 to the 21st power/cc. It has been proposed that these semiconductors can not preserve non-equilibrium point defect concentrations. This hypothesis has been tested in the present experiments by electron irradiating In2Te3 at 77 K with 1 MeV electrons and using electron paramagnetic resonance (EPR) to observe the results.

AD-A011 476/9GA PC$3.25/MF$2.25
Dayton Univ Ohio Dept of Physics
Cadmium-Diffused CuInSe2 Junction Diode and Photovoltaic Detection.
Journal article,
Phil Won Yu, S. P. Faile, and Y. S. Park. 3 Dec 74, 3p ARL-75-0117
Contract F33615-72-C-1099
Availability: Pub. in Applied Physics Letters, v26 n7 p384-385, 1 Apr 75.

Descriptors: *Copper alloys, *Indium alloys, *Selenides, *Semiconductor diodes, Semiconductor junctions, Photovoltaic effect, Chalcogens, Diffusion, Cadmium, Detection, Reprints.
Identifiers: Chalcopyrite.

Homojunction diodes have been prepared by diffusing cadmium into p-type CuInSe2. Forward-bias electrical characteristics exhibit a directly proportional to V cubed law, indicating double carrier flow. The photovoltaic response of typical diodes has a quantum efficiency of 35-40% in the wavelength region 0.9-1.2 mu. (Author)

AD-A011 524/6GA PC$3.25/MF$2.25
California Univ Berkeley Electronics Research Lab
Josephson Tunneling Through Locally Thinned Silicon Wafers,
C. Huang, and T. Van Duzer. 21 Aug 74, 5p
AFOSR-TR-75-0754
Grant AF-AFOSR-2113-71
Availability: Pub. in Applied Physics Letters, v25 n12 p753-756, 15 Dec 74.

Descriptors: *Josephson junctions, *Tunneling(Electronics), Silicon, Wafers, Superconductivity, Fabrication, Reprints.

Josephson junctions were made and tested in which tunneling takes place through a locally thinned region in a single-crystal silicon wafer. An etching technique is used to produce a square uniform thinned layer, 87.5 micrometers on a side and approx 400 A thick. After removal of the oxide layer, superconducting metals are deposited on both sides. Temperature and magnetic field dependences of the critical current, as well as the magnitude of the current, conform very closely to the theory for a Josephson tunnel junction. This is the first type of Josephson junction employing a barrier which is accessible for modification prior to deposition of the superconducting electrodes.

COM-75-50310/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Transient Thermal Response Measurements of Power Transistors.
Final rept.,
David L. Blackburn, and Frank F. Oettinger.
May 75, 8p
Pub. in IEEE Transactions on Industrial Electronics and Control Instrumentation, vIECI22 n2 p134-141 May 75.

Descriptors: *Transistors, Transient response, Thermal measurements, Computerized simulation.
Identifiers: Reprints.

Differences between the measured thermal impedance of power transistors when determined by the pulsed heating curve and cooling curve techniques are discussed. These differences are shown to result primarily because the power density distributions of these devices change as the devices heat; as a result of these changes the heating curve and the cooling curve are not conjugate. It is shown that the

cooling curve technique, when the cooling curve is initiated from the most non-uniform steady-state thermal distribution, (maximum voltage, maximum power) will indicate a larger value for the thermal impedance than will the pulsed heating curve technique, even for pulses in excess of the dc power level. A one-dimensional model for power transistor cooling is described. The theoretical predictions of the model are shown to be in good agreement for practical applications with three-dimensional computer simulations and experimental results. Using this model, it is possible to estimate an average junction temperature and the area of power generation at steady-state. Both TO-66 and TO-3 encased devices of mesa and planar structures were included in this study.

N75-22582/1GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Installation Procedure for Surface-Mounted Flat Conductor Cable Used in Commercial and Residential Wiring.
J. R. Carden. Mar 75, 31p NASA-TM-X-64916

Descriptors: *Flat conductors, *Power lines, Electric wire, Electrical insulation, Technology utilization.

For abstract, see STAR 1314

N75-22593/8GA PC$3.25/MF$2.25
Centre National de la Recherche Scientifique, Toulouse (France). Lab. d'Automatique et d'Analyse des Systemes.
Properties of a Diffused J FET with Vertical Channel Arrangement.
J. L. Morenzagil, and D. Esteve. 1974, 12p LAAS-PUBL-1191
Conf-Presented at the 4TH European Solid State Device Res. Conf., Nottingham, Engl., 16-19 Sep. 1974.

Descriptors: *Conferences, *Electrical measurement, *Field effect transistors, *Integrated circuits, *Junction transistors, *Power gain, Additives, Carrier injection, Characterization, Epitaxy, Graphs (Charts), Numerical analysis, System failures.

For abstract, see STAR 1314

N75-22769/4GA PC$3.75/MF$2.25
Marconi Space and Defence Systems Ltd., Camberley (England). Space and Instrumentation Div.
Design and Performance of Electrical Contacts for Use in Ultra-High Vacuum.
K. R. Dalley, and P. J. Donnell. 1975, 48p
Subm-Sponsored in Part by Min. Of Defence and Esro. Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Electric contacts, *Sliding friction, *Spacecraft environments, *Ultrahigh vacuum, Mechanical drives, Performance tests, Solar arrays, Spin reduction.

For abstract, see STAR 1314

N75-22773/6GA PC$3.75/MF$2.25
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany).
Functional Properties of Sliding Electrical Contacts at Continuous and Discontinuous Low Speed Operation at Ultrahigh Vacuum.
H. C. Goetting, and W. Wilkens. 1975, 27p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Electric contacts, *Low speed, *Sliding friction, *Ultrahigh vacuum, Contact resistance, Lubrication, Mechanical drives, Performance tests, Spacecraft environments, Wear.

For abstract, see STAR 1314

N75-23354/4GA PC$3.75/MF$2.25
Centre National de la Recherche Scientifique, Toulouse (France). Lab. d'Automatique et d'Analyse des Systemes.
Static and Dynamic Properties of Dual Gate MOS Tetrodes.
P. Rossel, and M. Belmas. 1974, 32p LAAS-PUBL-1189
Conf-Presented at the 4TH European Solid State Device Res. Conf., Nottingham, Engl., 16-19 Sep. 1974.

Descriptors: *Computerized simulation, *Dynamic models, *Metal oxide semiconductors, *Tetrodes, Amplification, Asymptotic methods, Electron mobility, High frequencies, Series (Mathematics), Volt-ampere characteristics.

For abstract, see STAR 1314

PAT-APPL-10 143/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Lossy High Voltage Feed-Thru Capacitor.
Patent Application,
Arthur E. Brockschmidt. Filed 13 Mar 75, 7p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Paper capacitors, Patents, Aluminum foil, Losses, High voltage, Feeding.
Identifiers: *Patent applications, PAT-CL-317-242.

The patent application describes an extended foil feed-thru capacitor including a resistance located in the capacitor case, in electrical series with the capacitor.

PB-242 208/7GA PC$4.75/MF$2.25
National Bureau of Standards, Washington, D.C. Center for Consumer Product Technology.
Special Report on Aluminum Wire.
Memorandum rept.,
Jacob Rabinow. 3 Sep 74, 93p

Descriptors: *Aluminum, *Electric wire, *Consumer protection, Accident prevention, Electric connectors, Thermal expansion, Stresses, Alloy steel, Copper alloys, Electrical resistance, Safety engineering, Fire safety.

The nature of the connection between aluminum wiring and various terminations, the best technical understanding of the mechanism of the connection, and the mechanism of failures were studied. Four major problems found with aluminum wire were the high coefficient of thermal expansion, the high amount of stress relaxation as compared to steel and copper alloys, the tendency to oxidize readily, and the high electrical resistance which requires thick sections. It was suggested that many types of connectors could be designed for aluminum and copper wires which would be easy to use, would cost only slightly more, and would be safer.

9B. Computers

AD-A011 119/5GA PC$3.25/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
NODCXBT Subroutine for CDC 1604.
Computer programming note,
Kevin Rabe. Jan 72, 7p Rept no. EPRF-CP Note-1

Descriptors: *Computer programming, Subroutines, Compilers, FORTRAN.
Identifiers: FORTRAN 63 programming language, CDC 1604 computers.

The subroutine is written in FORTRAN 63 for use on the CDC 1604 computer. It is designed to read one binary NODC XBT record at a time, so that desired records can be identified and retained, similar to the FNWC subroutine SPOTXBT.

AD-A011 131/0GA PC$3.75/MF$2.25
Bolt Beranek and Newman Inc Cambridge Mass
Distributed Computation and Tenex-Related Activities.
Quarterly progress no. 2, 1 Feb-30 Apr 75,
J. Burchfiel, R. Thomas, T. Myer, and R. Tomlinson. May 75, 35p Rept no. BBN-3089
Contract N00014-75-C-0773, DARPA Order-2901
See Quarterly progress rept. no. 1, AD/A-006 735.

Descriptors: *Data processing terminals, *Communications networks, Message processing, Interfaces, Time sharing, Data processing security.
Identifiers: TENEX system, ARPA computer network, *Computer networks, Terminal interface processors.

This report describes continuing refinement of the TENEX RSEXEC distributed file system which supports geography-independent computing on a number of ARPANET TENEX sites. It also describes efforts to upgrade existing ARPANET message service to meet NAVY requirements for an interactive message processing test at CINCPAC.

AD-A011 156/7GA PC$3.75/MF$2.25
California Univ Los Angeles Western Management Science Inst
Lagrangean Relaxation for Integer Programming,
A. M. Geoffrion. 25 Jan 74, 37p Rept no. WMSI Reprint-130
Contract N00014-69-A-0200-4042, Grant NSF-GP-26294
Availability: Pub. in Mathematical Programming Study, 2 p82-114 1974.

Descriptors: *Integer programming, *Linear programming, Vector analysis, Lagrangian functions, Relaxation, Theorems, Reprints.
Identifiers: Lagrangean relaxation.

Taking a set of a complicating constraints of a general mixed integer program up into the objective function in a Lagrangean fashion (with fixed multipliers) yields a Lagrangean relaxation of the original program. This paper gives a systematic development of this simple bounding construct as a means of exploiting special problem structure. A general theory is developed and special emphasis is given to the application of Lagrangean relaxation in the context of LP-based branch-and-bound. (Author)

AD-A011 182/3GA PC$13.00/MF$2.25
Army Computer Systems Command Fort Belvoir Va
Programing Procedures Manual.
16 Jun 75, 552p Rept no. USACSC-Manual-18-1-1

Descriptors: *Computer programming, *Instruction manuals, Specifications, Army, Syntax, Programming languages.
Identifiers: COBOL.

The US Army Computer Systems Command Programing Procedures Manual (USACSCM 18-1-1) is designed to be the primary source of information for USACSC programers. It is a working tool that provides standards, procedural guidance, recommended and directed pro-

graming techniques. The manual is primarily devoted to USACSC implementation of ANS-COBOL. The manual is structured to permit insertion/deletion/modification of guidelines and designed to allow stand alone sections for other languages to be added.

AD-A011 215/1GA PC$3.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Interactive Computer Network Graphics.
Technical rept.,
Joseph N. Golubov, David K. Robison, Courtenay B. Clifford, Bruce H. Gray, and George A. Panagos. May 75, 17p Rept no. ECOM-4316

Descriptors: *Interactive graphics, Cathode ray tube screens, Minicomputers, Management.
Identifiers: PERT, Computer networks.

An operated feasibility model of a computer program which creates an interactive graphic display of PERT networks from an existing data base is described. The operating model has the capability to create a full size PERT network plot on paper or an on line CRT display. The CRT display provides for simple self-teaching user interaction to control the program functions and make inquiries into the network PERT data.

AD-A011 276/3GA PC$6.25/MF$2.25
Picatinny Arsenal Dover N J Management Information Systems Directorate
Common Interactive Graphics Application Routines (CIGAR).
Final User's Manual,
Wayne D. Lunger. May 75, 160p Rept no. MISD-UM-75-1
See also report dated Dec 72, AD-755 788.

Descriptors: *Interactive graphics, Cathode ray tube screens, Computer programming, Instruction manuals.
Identifiers: CDC 6500/1700/274 system, CIGAR project.

With the introduction of interactive graphics into the computing community, bits and pieces of different graphical techniques and capabilities were initially developed to solve different problems on different machines in different languages. The collection and combination of these techniques into one package became a recognized necessity. This was the primary aim of CIGAR - a package of Common Interactive Graphics Application Routines. This package presently enables: the 'drawing' of lines, arcs, and curves; translate, rotate, duplicate, mirror, and erase operations; scale changing, calculation of dimensions, and storage and recall from a data base. CIGAR presently operates on the CDC 6500/1700/274 Digigraphics system at Picatinny Arsenal under SCOPE 3.4.1, IGS V.2, employing 16 overlays and 53.3 K bytes of storage.

AD-A011 359/7GA PC$5.75/MF$2.25
Ohio State Univ Columbus Computer and Information Science Research Center
A Model for Data Secure Systems.
Technical rept.,
Edwin John McCauley, III. Mar 73, 128p Rept no. OSU-CISRC-TR-75-2
Contract N00014-75-C-0573

Descriptors: *Data processing security, *Data management, *Data bases, Mathematical logic, Boolean algebra, Algorithms.
Identifiers: File structures, Deadlock, Data management systems.

The topic of this work is protection and access control in data base management systems. Because of the diverse nature of the problem the author has studied it with a multi-level modelling technique. This approach allows the treatment of specific issues at a level of abstraction appropriate to that issue. The highest level, the conceptual model, is concerned with a thorough description of the terms and concepts of protection. The second level of modelling, the structural model, is concerned with the basic structure of the data base. The third level, the engineering model, is an attempt to relate the largely theoretical results of the higher levels to some of the practical realities of typical data base management systems. In the lowest level the completeness and correctness of a small demonstration system are discussed. The correctness techniques may be viewed as a sketch of a formal algorithm proof.

AD-A011 364/7GA PC$3.25/MF$2.25
Idaho Univ Moscow Dept of Electrical Engineering
Reliable Sequential Circuit Design - 4 Papers.
Technical rept. 1 Nov 73-31 Dec 74,
Gary K. Maki. 20 Jun 75, 19p
Contract N00014-72-A-0232-0002

Descriptors: *Logic circuits, *Reliability(Electronics), Gates(Circuits), Redundant components, Switching circuits, Theorems.
Identifiers: *Sequential circuits, *Asynchronous sequential circuits, Fault tolerant computing, Logic design.

Contents:
Fail safe asynchronous sequential machines;
A sequential array switch, Multiple fault tolerant design of asynchronous sequential machines;
A new fault tolerant design for sequential circuits.

AD-A011 375/3GA PC$3.25/MF$2.25
California Univ Los Angeles Graduate School of Management
Computer Network Usage -- Cost-Benefit Analysis.
Technical rept.,
Bennet P. Lientz. 15 Jun 75, 19p Rept no. TR-5
Contracts N00014-67-A-0269-0027, N00014-69-A-0266
Put in Information Systems and Networks, p 117-131 1975. See also report dated Dec 73, AD-774 740.

Descriptors: *Communications networks, Cost effectiveness, Integer programming, Mathematical models.
Identifiers: *Computer networks, *Benefit cost analysis.

With the establishment of several computation-communication networks several questions arise as to the cost-effectiveness of a network for a particular potential user. Analysis is necessary to determine which software systems can be established and used on a network rather than the internal computer of user's organization. The timings of transitions to the network must also be found. A methodology for cost/benefit analysis is presented. For multiple systems, an extended horizon and restricted resources, an integer programming method is developed. Approximations for planning and a discussion of stability are given. A numerical example is included.

AD-A011 376/1GA PC$3.25/MF$2.25
California Univ Los Angeles Graduate School of Management
Cost Tradeoffs Between Local and Remote Computing.
Technical rept.,
Bennet P. Lientz. 15 Jun 75, 11p Rept no. TR-4
Contracts N00014-67-A-0269-0027, N00014-69-A-0266
Pub. in Computer Communication Networks, p469-480 1975.

Descriptors: *Communications networks, Centralized, Cost effectiveness, Message processing.
Identifiers: *Computer networks, Centralization, Benefit cost analysis, Network analysis theory.

A major problem in communication networks analysis is to determine the degree of centralization of computer power that is desirable from both an operational and cost/benefit point of view. An example of this problem occurs in a manufacturing complex wherein decisions must be made on the distribution of data, process power, and redundancy. Because of the many parameters involving hardware, system software, and communications, a purely analytical approach is often impractical. The method here is to employ an analytical simulation model to obtain measures of cost, throughput, and response time. After the model itself is examined, focus is placed on several experiments which reveal the superiority of semi-centralized configurations. Application to logistic and manufacturing systems are explored along with the development of a network link construction method.

AD-A011 410/8GA PC$3.25/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
STATPROG Subroutines for CDC 1604.
Computer programming note,
Carol A. Simpson. Sep 72, 25p Rept no. EPRF-CP Note-4

Descriptors: *Computer programming, *Statistical analysis, Time series analysis, Harmonic analysis, Correlation techniques, Fourier analysis, Histograms, Subroutines.
Identifiers: STATPROG computer program, CDC 1604 computers.

A description of each of the routines listed below is provided in this document. The routines are included on the tape STATPROG: CURVTRAN - Performs a number of transformations on data as specified by the programmer; LNGRPH - Plots a line graph of data, adjusting the values to fit a scale of 0 to 109; HARMAL - Performs a harmonic analysis of a time series of data equi-distantly spaced in time and plots a Fourier spectral analysis of the wave form; AUTCOR - Computes autocorrelation coefficients for a time series for a specified amount of lag and a specified number of lags; TIMCOR - Computes a correlation coefficient for two time series of equal number of data and data spaced equi-distantly in time; TWOAOV - Computes two-way analysis of variance for maximum of 20 groups of 1000 data points each.

AD-A011 582/4GA PC$6.25/MF$2.25
Purdue Univ Lafayette Ind School of Industrial Engineering
SAINT: Volume II. User's Manual.
Final rept.,
David B. Wortman, A. Alan B. Pritsker, Charles S. Seum, Deborah J. Seifert, and Gerald P. Chubb. Apr 74, 158p AMRL-TR-73-128
Contract F33615-73-C-4029

Descriptors: *Computer programs, *Systems analysis, Computerized simulation, Networks, Statistical analysis, Decision making, FORTRAN.
Identifiers: SAINT computer program, *Task analysis.

SAINT is a modeling procedure and a computer program which prescribes a method for performing a Systems Analysis of Integrated Networks of Tasks. SAINT simulates a network of tasks that are performed by a set of operators involved in a mission under adverse conditions. A user of SAINT need not be a computer programmer, as no computer programming is

required. SAINT accepts a description of the network to be simulated and automatically performs an analysis to obtain statistical quantities as specified by the user. SAINT is a powerful and flexible tool. The models that can be simulated using SAINT can be extremely complex. The multitude of concepts included in SAINT and its extensive analysis capability require that the user prepare the input data in a consistent form. This report describes the procedures for preparing the input data for SAINT and discusses the output reports obtained from SAINT.

AD-A011 662/4GA PC$3.25/MF$2.25
Computer Sciences Corp Falls Church Va Geonautics Operation
An Interactive System for Digital Image Processing and Pattern Recognition.
Interim rept.,
Edward M. Sims, Nelson R. Corby, Lester A. Gerhardt, and James W. Modestino. 1975, 16p
AFOSR-TR-75-0809
Grant AF-AFOSR-2486-73

Descriptors: *Image processing, *Pattern recognition, *Interactive graphics, Minicomputers, Input output processing, Cathode ray tube screens, Memory devices.
Identifiers: Varian 620/i computers.

The RPI IGIPS facility provides a flexibility of operation not offered by many larger systems. The cost is kept moderate by the use of a minicomputer as central processor. (The cost of all basic image processing peripheral devices described here is less than that of the Varian/IDIIOM combination). The existing I/O data controllers and graphics capabilities and the proposed operating system will provide a flexible basic system which should not be outmoded as new I/O devices and specialized processors are interfaced. The system resolution (512x512), though less than that of some larger facilities has not been found restrictive for basic research into image properties. Computing power is sufficient to perform most applications in a very reasonable amount of processing time.

AD-A011 667/3GA PC$3.25/MF$2.25
Princeton Univ N J Dept of Electrical Engineering
Limit Cycles in Combinatorial Filters Using Two's Complement Truncation Arithmetic.
Interim rept.,
Tran Thong, and Bede Liu. Oct 74, 6p AFOSR-TR-75-0804
Grant AF-AFOSR-2101-71

Descriptors: *Arithmetic units, *Digital filters, Combinatorial analysis, Read only memories.
Identifiers: Limit cycles.

The existence of first and second order limit cycles in combinatorial filters using two's complement truncation arithmetic is investigated in this paper. Exact results for first order cycles are presented. Some results in second order cycles are obtained by using an effective value linear model. Bounds on these cycles are also derived.

AD-A011 670/7GA PC$3.75/MF$2.25
Michigan Univ Ann Arbor Systems Engineering Lab
Two Studies on Abstract Pattern Recognition.
Interim rept.,
William A. Porter. Mar 75, 50p Rept nos. SEL-TR-85, SEL-85-011321-10-T AFOSR-TR-75-0807
Grant AF-AFOSR-2427-73

Descriptors: *Pattern recognition, Statistical analysis, Exponential functions, Computerized simulation.
Identifiers: Discriminant functions.

Contents:
'A Comparison of Selected Pattern Recognition Functions';
'A Class of Error Tolerant Pattern Discrimination Functions'.

AD-A011 675/6GA PC$4.75/MF$2.25
Southeastern Massachusetts Univ North Dartmouth Dept of Electrical Engineering
Theory and Applications of Image Pattern Recognition.
Interim technical rept.,
C. H. Chen. 24 Feb 75, 81p Rept no. EE-75-3
AFOSR-TR-75-0795
Grant AF-AFOSR-2119-71

Descriptors: *Pattern recognition, *Image processing, Aerial photography, Interactive graphics, Fourier transformation, Walsh functions, Analysis of variance, Computations, Computer programs, FORTRAN.
Identifiers: Computational complexity, Feature extraction, Fast Fourier transform, Walsh transformation, FORTRAN 4 programming language.

In recent years, there has been increasingly great demand for automatic recognition of imagery patterns which arise in biomedical, space, military, security and vast number of other applications. As the computer hardware cost decreases rapidly, automatic image recognition will soon become a reality in many of these applications. Automatic image recognition is also a major step toward designing intelligent machines. In this report, a unified theory of image pattern recognition is developed which includes pattern representation, preprocessing, feature extraction and pattern classification. Computer results from aerial photograph studies are used for illustrative purposes. The theory should be useful for a wide range of imagery patterns. The problem of computational complexity which should be the primary consideration in recognition system design is carefully examined. As the imagery patterns are complicated in nature, it is recommended that both statistical and syntactic methods in pattern recognition should be used to arrive at the best solution for the specific recognition task at hand. Extensive bibliography at the end of the report provides a fairly complete view of the past efforts, approaches and applications of image pattern recognition.

COM-75-10774/8GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
Software Testing for Network Services.
Final rept.,
Rona B. Stillman, and Belkis Leong-Hong. Jul 75, 44p NBS-TN-874
Grant NSF-AG-350
Library of Congress Catalog Card no. 75-600046. Paper copy also available from GPO as C13.46:874.

Descriptors: *Computer networks, *Computer programming, Reliability, Tests, Accuracy, Acceptability, FORTRAN.
Identifiers: *Computer program reliability.

This report is a first step toward identifying effective software test and measurement tools, and developing a guide for their usage network-wide. The utility of two tools, the NBS FORTRAN Test Routines and the NBS Analyzer, is studied experimentally, and indications of their role in systematic testing in a networking environment are given.

COM-75-50382/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Standardized Instrumentation System for Computer Automated Measurement and Control.
Final rept.,
Louis Costrell. 1975, 5p
Pub. in IEEE Transactions on Industry and General Applications, vIA11 n3 p319-323 May/Jun 75.

Descriptors: *Computers, *Automatic control.
Identifiers: *CAMAC system, Reprints.

A standardized instrumentation system for computer automated measurement and control (CAMAC) is gaining wide international acceptance for industrial and laboratory applications. The system features a fully specified dataway together with modular functional units that are completely compatible with each other and that are available from diverse sources. The system is nonproprietary and can be freely used without license or restriction of any kind.

NTIS/PS-75/514/0GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Pattern Recognition (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
David W. Grooms. Jun 75, 189p*
Supersedes NTIS/PS-74/084.

Descriptors: *Bibliographies, *Pattern recognition, *Character recognition, Signal processing, Coding, Color, Mapping, Data processing, Aerial photography.
Identifiers: *Image processing, Image enhancement, Image restoration, Feature extraction, Scene analysis.

The bibliography cites research in the areas of pattern recognition, character recognition, and image processing. It includes research in processing color pictures, coding methods, image enhancement and restoration, and feature extraction. theory and applications are also covered. (Contains 184 abstracts).

NTIS/PS-75/524/9GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Computer Networks (A Bibliography with Abstracts).
Rept. for 1969-Jun 75,
David W. Grooms. Jun 75, 250p*
Supersedes COM-74-11572.

Descriptors: *Bibliographies, *Computer networks, Computer programming, Computer systems hardware, Telecommunication, Time sharing, Queueing theory, Scheduling, Data transmission.
Identifiers: ARPA computer network, ALOHA system, GLOBNET system.

The citations present research on all aspects of computer networks including hardware, software, data transmission, time sharing, and applicable theory to network design. Specific studies on the ARPA network, the ALOHA system, and GLOBNET are included. (Contains 245 abstracts).

NTIS/PS-75/528/0GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Computer Storage Management (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
David W. Grooms. Jun 75, 134p*
Supersedes NTIS/PS-74/095.

Descriptors: *Bibliographies, *Computer storage devices, Semiconductor computer storage, Read only storage, Allocations, Computer programming, Compilers.
Identifiers: *Computer storage management, Paging, Virtual memory, File structures.

Cited research covers dynamic storage allocation, paging, interleaved memory, virtual memory, and semiconductor computer storage. Also included are the necessary programs, compilers, and algorithms for implementation in various computer systems. (Contains 129 abstracts).

N75-22585/4GA PC$4.25/MF$2.25
Defence Research Establishment Valcartier (Quebec).
A Digital Scan Converter Using Semiconductor Memory.
G. Vail. Feb 74, 74p DREV-R-702/74

Descriptors: *Computer storage devices, *Core storage, *Digital systems, *Infrared imagery, *Semiconductor devices, Cathode ray tubes, Computers, Data processing, Display devices, Integrated circuits.

For abstract, see STAR 1314

N75-23187/8GA PC$3.75/MF$2.25
National Physical Lab., Teddington (England). Div. of Numerical Analysis and Computing.
Testing the Diagnostic Features of the Babel Compiler.
R. S. Scowen. Sep 74, 33p NPL-NAC-57

Descriptors: *Compilers, *Performance tests, Computer programs, Error detection codes, Operating systems (Computers).

For abstract, see STAR 1314

PAT-APPL-563 004/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Multipurpose Keyboard System.
Patent Application,
Don E. Collins. Filed 27 Mar 75, 15p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Input output devices, *Keyboards, Patents, Functions, Selection, Multipurpose.
Identifiers: *Patent applications, PAT-CL-340-365.

The patent application describes a system for varying the function of a keyboard using a plurality of status keys to select a function. The status keys form a binary which are decoded in a first word decoder forming a single word which are fed to a plurality of binary decoders one each associated with one of the information keys on the keyboard for controlling the readout thereof. The information keys are also switches that activate a word encoder for producing a final output. A comparator gate can be interposed between the word encoder and the selection switches of the information keys, the gate being enabled by the first word decoder. The decoded word originating from the status keys also feed a segment decoder which activates segments surrounding selected information key elements.

PATENT-3 879 605 Not available NTIS
Department of the Air Force Washington D C
Special Purpose Hybrid Computer to Implement Kronecker-Matrix Transformations.
Patent,
Joseph W. Carl, and Richard V. Swartwood.
Filed 4 Jun 73, patented 22 Apr 75, 16p Rept nos. PAT-APPL-366 915,
Supersedes AD-164 535.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Hybrid computers, *Walsh functions, Matrices(Mathematics), Computations, Logic circuits, Analog to digital converters, Recursive functions, Algorithms.
Identifiers: *Walsh transformation, PAT-CL-235-156, Kronecker products.

It is one object of the invention, therefore, to provide an improved Walsh transform computer using a recursive algorithm to perform the Walsh transform function which results in a reduction in hardware implementation. It is another object of the invention to provide an improved Walsh transform computer using only N summing junctions where N is the total number of input data samples. It is yet another object of the invention to provide an improved Walsh transform computer wherein a feedback-in-time circuit is used to implement the Kronecker-product rule.

PB-242 172/5GA PC$4.75/MF$2.25
National Institutes of Health, Bethesda, Md. Div. of Computer Research and Technology.
RMAGASM Compiler--A Block Structured 360/370 Assembly-Language Source-Program Generator. User's Guide,
Robert A. Magnuson. 1 May 75, 81p* NIH-DCRT-DMB-SSS-UG102b NIH/DF-74/002a
See also magnetic tape, PB-236 860. Supersedes PB-236 861.

Descriptors: *Compilers, *Programming manuals, Assembly languages, Computer programming, Coding.
Identifiers: RMAGASM computer program, *Structured programming, IBM 360 computers, IBM 370 computers, *RMAG21 computer program.

RMAGASM is a powerful compiler used to generate block-structured 360/370 assembly-language source code. It is used by adherents of structured programming as well as by those who want to understand all parts (i.e., instructions, data, tables, etc.) of the programs they write. RMAGASM is itself a macro program implemented in the RMAG21 language. In addition to the usual structured programming features, it contains (a) the ability to handle sentential calculus schemata, (b) the power to generate translate tables, (c) a powerful macro facility, and, (d) the capacity to automatically indent generated code. RMAGASM or its predecessor (SPALC) have been in use at the NIH computer facility since early 1973.

9C. Electrical and Electronic Engineering

N75-22686/0GA PC$3.25/MF$2.25
National Aerospace Lab., Tokyo (Japan).
Study of a Low-Inertia Hysteresis Motor.
H. Yamada. 1975, 9p NAL-TR-405
In Japanese; English Summary.

Descriptors: *Hysteresis, *Torque motors, Anisotropic plates, Barium ferrates, Energy conversion efficiency, Inertia, Rotary gyroscopes, Servomotors.

For abstract, see STAR 1314

9D. Information Theory

AD-A011 423/1GA PC$4.75/MF$2.25
Naval Research Lab Washington D C
Overview of Digital Signal Processing Theory.
Interim rept.,
Lawrence M. Leibowitz. 20 May 75, 92p Rept no. NRL-7870

Descriptors: *Signal processing, *Data transmission systems, Digital filters, Fourier transformation, Laplace transformation, Quantization, Analog to digital converters.
Identifiers: Discrete Fourier transform, Fast Fourier transform, Data transmission, Floating point operation.

An overview of the theory of digital signal processing is presented here using key portions of the applicable technical literature. This can serve either as an introduction for those who desire to pursue the subject further or as a concise summary for those for whom more detailed investigation would be impractical. The discussion begins with a consideration of discrete systems and signals as well as their relationship to the continuous case. The realization of digital signal processing systems in the form of digital networks is presented. Theory and design of digital filters are discussed along with their relation to continuous filter characteristics. The discrete Fourier transform (DFT) and its efficient implementation in the form of the fast Fourier transform (FFT) are presented. Discrete convolution and correlation and the application of the FFT to their efficient implementation are described. Finallly the quantization effects inherent in all digital signal-processing realizations are reviewed with respect to their influence on digital-filter and FFT outputs.

AD-A011 520/4GA PC$3.25/MF$2.25
Maryland Univ College Park Computer Science Center
Optimum Sequential Detector Performance on Intersymbol Interference Channels,
Bruce D. Fritchman, Laveen N. Kanal, and James D. Womer. 4 Jun 73, 42p AFOSR-TR-75-0641
Grant AF-AFOSR-1982-71
Availability: Pub. in IEEE Transactions on Communications, vCOM-22 n6 p788-797 Jun 74.

Descriptors: *Information theory, *Optical detectors, *Symbols, Signal processing, Computer logic, Sequential analysis, Nonlinear systems, Phase shift, Probability, Errors, Signal to noise ratio, Low pass filters, Amplitude modulation, Data transmission systems, Decision theory, Channels, Reprints.
Identifiers: *Symbolic logic, Phase shift keying, Intersymbol interference, Sequential detector.

Tight upper and lower bounds on the average probability of error are obtained for the nonlinear optimum sequential detector with zero 'look ahead'. A linear upper bound is obtained that is very tight over a wide range of signal-to-noise ratios and a wide range of values of the intersymbol interference. The structure of the linear detector whose performance is given by the linear bound is determined and shown to take the form of a semi-infinite transversal equalizer. The tap values of the equalizer are related to the channel impulse response and the performance of realizable truncated equalizers is obtained in the form of the average probability of error versus equalizer length. (Author)

AD-A011 627/7GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Electronic Systems Lab
Fourier Series and Estimation on the Circle with Applications to Synchronous Communication. Part I. Analysis,
Alan S. Willsky. 26 Jul 73, 8p AFOSR-TR-75-0854
Grant AF-AFOSR-2273-72
See also Part 2, AD-A011 628.
Availability: Pub. in IEEE Transactions on Information Theory, vIT-20 n5 p577-583 Sep 74.

Descriptors: *Information theory, *Fourier analysis, *Fourier series, Tracking, Phase(Electronics), Frequency, Demodulation, Noise(Electrical and electromagnetic), Reprints.
Identifiers: Synchronous communication.

A wide variety of continuous- and discrete-time estimation problems on the circle S are considered with the aid of Fourier series analysis. Measurement and diffusion update equations are derived for the conditional expectation of

certain functions of the parameter to be estimated, and the use of Fourier series to obtain easily implemented optimal estimation equations is investigated. A variety of important examples - phase tracking, frequency demodulation, and phase demodulation in the presence of oscillator instabilities, additive noise, Rayleigh fading, or any combination of these, are considered. (Author)

AD-A011 628/5GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Electronic Systems Lab
Fourier Series and Estimation on the Circle with Applications to Synchronous Communication Part II. Implementation.
Alan S. Willsky. 26 Jul 73, 9p AFOSR-TR-75-0855
Grant AF-AFOSR-2273-72
See also Part 1, AD-A011 627.
Availability: Pub. in IEEE Transactions on Information Theory, vIT-20 n5 p584-590 Sep 74.

Descriptors: *Information theory, *Fourier analysis, *Fourier series, Approximation(Mathematics), Phase(Electronics), Tracking, Demodulation, Omega navigation, Reprints.
Identifiers: Synchronous communication.

The practical implementation of the infinite-dimensional optimal estimation results presented in Part I of this series is considered. Several techniques are described in detail. Included among these is the so-called assumed density approximation technique. Finite-dimensional suboptical filtering equations based on this method are derived for several of the phase-tracking/demodulation problems studied in Part I. Finally, these techniques are applied to a phase tracking problem of importance in navigation systems such as Omega, and simulation results are reported that favorably compare a system designed using these techniques to an optimal phase-lock loop and an optimal linear system. (Author)

AD-A011 669/9GA PC$4.75/MF$2.25
Rome Air Development Center Griffiss AFB N Y
Use of the Cepstrum for Processing Multipath Signals. II.
Final rept. Sep 70-Dec 74,
Harry Schwarzlander, Bernard Silverman, and Reinhard Hohensee. May 75, 80p Rept no. RADC-TR-75-117
See report dated Mar 72, AD-740 586.

Descriptors: *Data transmission systems, *Multipath transmission, *Information theory, Signal processing, Fourier transformation, Complex variables, Computations, Quantization, Distortion, High frequency.
Identifiers: Cepstrum technique, PDP 8 computers, Fast Fourier transform.

The report summarizes an investigation into the use of cepstrum analysis in connection with the processing of communication signals which have been corrupted by multipath effects. Following up on an earlier phase of work, the primary objective consisted of the development and performance evaluation of an experimental setup, incorporating a minicomputer, for on-line cepstrum analysis of baseband communication signals. The purpose of the cepstrum analysis is the extraction of multipath information which can then be used to maintain a multipath cancellation filter in correct adjustment. Another objective was the design of signal waveforms whose cepstra have desirable properties for this type of processing. The basic experimental setup was completed and is described in this report. Test data is presented which was obtained with signals from various modems and with simulated simple discrete multipath interference. Various sources of error are discussed and analyzed.

N75-23185/2GA PC$3.25/MF$2.25
Notre Dame Univ., Ind. Dept. of Electrical Engineering.
A Recommended R Equals 1/2, K Equals 32, Quick-Look-In Convolutional Code for NASA Use.
J. L. Massey. 28 Apr 75, 14p NASA-CR-142725, TR-EE-751
Grant NSG-5025

Descriptors: *Binary codes, *Convolution integrals, *Decoding, Error analysis, Ibm computers, Performance prediction, Random noise.

For abstract, see STAR 1314

9E. Subsystems

AD-A011 143/5GA PC$7.00/MF$2.25
IIT Research Inst Chicago Ill
Multi-Band Frequency Converter.
Final rept.
Apr 75, 183p Rept no. IITRI-E6295-FR
Contract N00039-74-C-0034

Descriptors: *Frequency dividers, *Frequency converters, Microwave equipment, Multichannel, Superhigh frequency, Microwave oscillators, Gunn diodes, Waveguide couplers, Schottky barrier devices, Mixers(Electronics), Integrated circuits.

The report describes work on a sensitive superheterodyne frequency downconverter to convert six channels in the 18-42 GHz range to the 4-8 GHz range. Accomplishments include: The design and fabrication of 26, 30, and 34 GHz Gunn diode oscillators providing +14 dBm output power; The design of broadly frequency selective channel dropping couplers which can be fabricated in dielectric image guide; The design and fabrication of Schottky-Barrier diode mixer mount with a 6-8 dB conversion loss over the 18-22 GHz band. The design and fabrication of an integrated mixer assembly in metal waveguide which includes both waffle iron and waveguide-below-cutoff filters, a 10 dB LO post-type coupler, and a single ended diode mixer; The design and fabrication of a coax to image guide mode converter (launcher); The evaluation of thin film attenuators to be used with image guide.

AD-A011 343/1GA PC$3.25/MF$2.25
Braddock Dunn and Mcdonald Inc El Paso Tex
Technical Tasks for the NET-2 Network Analysis Program.
Final rept. 1 Jan-31 Dec 74,
Allan F. Malmberg. Dec 74, 21p HDL-071-1
Contract DAAG39-74-C-0071
Sponsored in part by Defense Nuclear Agency, Washington, D.C.

Descriptors: *Electrical networks, *Computerized simulation, *Bipolar transistors, Computer programs, Mathematical models.
Identifiers: NET 2 computer program, Equivalent circuits.

Various technical tasks have been performed in support of the NET-2 Network Analysis Program, Release 8 and Release 9. These tasks include final checkout of Release 9, data structure improvements, work on eliminating computational delay, maintenance of the program, and addition of the Gummel-Poon bipolar transistor model.

AD-A011 348/0GA PC$7.50/MF$2.25
University of South Florida Tampa Dept of Electrical Engineering
SUPER-SCEPTRE. User's Manual. A Program for the Analysis of Electrical, Mechanical, Digital, and Control Systems. Revision I.
Final rept.,
James C. Bowers, John E. O'Reilly, and Gary A. Shaw. May 75, 233p
Contracts DAAA21-73-C-0433, DAAA21-73-C-0655
Report on AMC CAD-E Series. See also AD-782 251 and AD-787 522.

Descriptors: *Electrical networks, *Mechanical components, *Computer applications, Logic circuits, Mechanical engineering, Gates(Circuits), Computer programming, Instruction manuals, FORTRAN.
Identifiers: *SUPERSCEPTRE computer program, SCEPTRE computer program, FORTRAN 4 programming language, Network analysis theory, Computer aided design, Feedback control.

SUPERSCEPTRE is a preprocessor developed for use in conjunction with the SCEPTRE circuit analysis program. SUPERSCEPTRE enables the user to simulate one-dimensional,n-degree of freedom mechanical systems, transfer functions, and digital logic devices in addition to electrical networks. SUPERSCEPTRE retains the useful features of SCEPTRE and includes a mechanical description language analogous to the SCEPTRE circuit description language. The language is easy to learn and no previous computer programming experience is needed to use SUPERSCEPTRE effectively. The derivation of equations is not required since SUPERSCEPTRE automatically formulates the describing equations of a system from the component values and the system topology.

AD-A011 390/2GA PC$3.75/MF$2.25
Westinghouse Research Labs Pittsburgh Pa
Thin Film Display Switches.
Final rept. 1 Apr-12 Dec 74,
Thomas P. Brody, and Karl K. Yu. 7 May 75, 43p Rept no. 75-9G9-PRNTM-R1
Contract N00014-71-C-0269
See also report dated Dec 73, AD-772 544.

Descriptors: *Matrix displays, *Thin film storage devices, Transistors, Panels, Electroluminescence, Display systems.
Identifiers: Electroluminescent panels.

A thin film transistor with a floating second gate, capable of nonvolatile storage of analog data, was the subject of the investigation. Further development resulted in a closely controlled, reproducible fabriacation process and a higher voltage capability. A 40x40 element, 1 inch square matrix, consisting of X-Y addressible memory transistors at each point was designed, laid out using CAD techniques and fabricated in a single vacuum deposition cycle. Mask and substrate registration techniques were also improved, resulting an excellent run-to-run reproducibility of the deposition patterns. By coating the finished memory matrices with an electroluminescent phosphor (Westinghouse 'hypermaintenance' phosphor), providing a common transparent front electrode and sealing with a cover-glass, complete 40 x 40 element storage displays were made. The displays were operable up to 140V peak-to-peak. The EL driving frequencies ranged from 3 to 20 kHz. Writing of information into individual elements was demonstrated by (manual) pulsing of rows and columns. Letters were written into the panel in this manner, and the nonvolatile storage of such patterns over periods of excess of 90 minutes was demonstrated.

AD-A011 399/3GA PC$4.75/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Systems Engineering Directorate
The Design of a Dual Edge and Level Flip-Flop.
Technical rept.,
Donald L. Roberson Nov 74, 82p Rept no. RC-75-2

Descriptors: *Flip flop circuits, Bistable devices, Integrated devices, Sequential.

Identifiers: Design.

The study analyzes the operation of currently manufactured edge sensitive flip-flops based on the activity of the internal state variables. These edge sensitive devices are grouped into seven families according to their mode of operation, and an analysis table is developed for each family. A detailed study of each analysis table is conducted and the findings, including a decision as to whether the device can be used with the edge and level sensitive analysis and synthesis procedures previously developed, and presented. Finally, a new Dual Edge and Level (DEL) flip-flop that can be manufactured as a single integrated circuit is developed. A detailed analysis and evaluation of the DEL flip-flop is also presented.

AD-A011 499/1GA PC$4.75/MF$2.25
TRW Systems Group Redondo Beach Calif
Charge Coupled Devices in Signal Processing Systems. Volume II. Analog Signal Processing.
Final rept. Apr-Oct 74,
Thomas A. Zimmerman, and Chauncey S. Miller. Dec 74, 94p
Contract N00014-74-C-0068
See also Volume 1, AD-782 574.

Descriptors: *Charge coupled devices, *Signal processing, Analog systems, Recursive filters, Fourier transformation, Correlators, Matched filters, Delay lines, Radar, Shift registers, Data storage systems.

This document is the second volume prepared under the Contract to apply charge coupled devices (CCD) to signal processing systems. Volume I was concerned with digital signal processing; this volume addresses the problems of analog signal processing. The application of CCD's to analog signal processing was investigated. The ideal analog application of CCD's is the correlation function. Both recursive and nonrecursive analog sampled data filters are discussed. CCD matched filter designs are analyzed and design criteria derived. System applications are detailed. These include range gated filters, doppler comb filters, and IFF beacons for radar systems; analog recursive filters and correlators for communication systems; and memories for processing systems.

AD-A011 532/9GA PC$3.25/MF$2.25
Illinois Univ Chicago Dept of Information Engineering
Synthesis of the Antenna Pattern for a Radiating Slot in a Metal Cylinder,
Olov Einarsson, Frederick B. Sleator, and Piergiorgio L. E. Uslenghi . 10 Oct 72, 11p
AFOSR-TR-75-0697
Grant AF-AFOSR-2263-72
Availability: Pub. in IEEE Transactions on Antennas and Propagation, vAP-23 n1 p28-36 Jan 75.

Descriptors: *Slot antennas, *Antenna radiation patterns, *Satellite antennas, Metals, Cylinders, Synthesis, Satellite communications, Mathematical analysis, Reprints.

The synthesis of a prescribed far-field pattern by means of a radiating slot in a perfectly conducting infinite circular cylinder is considered. The narrow circumferential slot and the infinite axial slot are studied in detail. In either case, the problem is to find the distribution of the electromagnetic field in the aperture that yields a radiation pattern that is the best mean-square approximation to a given pattern, under certain constraints. Various quality factors for cylindrical modes are discussed, and a detailed comparison with the synthesis problem for a planar aperture is performed. It turns out that Rhodes' synthesis method has no equivalent in the cylindrical case, and that the best admissible mean-square approximation to a given pattern may be a very poor approximation in amplitude. However, an iteration scheme is developed in which the phase approximation is sacrificed for the sake of substantially improving the amplitude approximation. Numerical results based on such a scheme are displayed, for prescribed omnidirectional and sectoral patterns.

AD-A011 535/2GA PC$3.75/MF$2.25
Stanford Research Inst Menlo Park Calif
Cellular Logic-in-Memory Arrays.
Final rept.,
Marshall C. Pease. Sep 74, 42p
Contract N00014-72-C-0431
See also report dated 29 Aug 73, AD-766 471.

Descriptors: *Signal processing, *Digital filters, Fourier transformation, Logic circuits, Shift registers, Radar signals, Integrated circuits.
Identifiers: Cellular logic in memory arrays, Fast Fourier transform, Discrete Fourier transformation, Large scale integrated circuits.

The objective of this effort was to determine the engineering feasibility of an all-digital transverse filter for signal processing requirements. This assessment is made by analyzing alternative circuit configurations to enough accuracy and depth to determine if prescribed functional and speed specifications can be met, and if so, to calculate the approximate hardware cost.

AD-A011 603/8GA PC$7.00/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Impact of SAW Filters on RF Pulse Frequency Measurement by Double Detection.
Physical sciences research papers,
K. R. Laker, and A. J. Slobodnik, Jr. 6 Jan 75, 194p Rept nos. AFCRL-PSRP-621, AFCRL-TR-75-0011

Descriptors: *Band pass filters, Acoustic waves, Surface waves, Radiofrequency pulses, Measurement, Frequency bands, Detection, Mathematical models, Computer programs.
Identifiers: Acoustic surface waves.

When it is desired to measure the frequency of RF pulses to within a resolution comparable to the pulse spectral width, special techniques must be adopted. Double detection is such a method. The report presents a simplified mathematical model of the double detection frequency measurement technique. Both frequency and time domain (through the use of an FFT routine) responses of the two individual filters are considered along with the difference of the squares of the time domain responses. Good agreement between theory and experiment is shown. The model includes gating and thresholding and the effects of these parameters are investigated. A complete computer program description, listing, and test case are given. This model can be used to optimize the parameters of a double-detection system. Finally, the model has been used to evaluate the double detection performance of a variety of filter responses including Butterworth, flat exponential filter, brick wall, Kaiser truncated sinx/x, Hamming, and Gaussian.

AD-A011 652/5GA PC$3.75/MF$2.25
Air Force Special Weapons Center Kirtland AFB N Mex
Constant-K/M-Derived Digital Filter/Smoothers.
Technical rept.,
Austin L. Foote, and Walter G. Murch. 28 May 74, 43p Rept no. AFSWC-TR-74-16

Descriptors: *Low pass filters, *High pass filters, *Digital filters, *Data reduction, Differential equations, Transfer functions, Mathematical models.
Identifiers: Network analysis theory.

This report develops the theory and equations for linear, first-order, constant coefficient, differential equations to implement digitally low-pass and high-pass filter/smoothers for use in post-test data reduction and analysis. The derivations are based on the theory developed by O. J. Zabel in 1923 for continuous constant-K/M-derived filters. A constant-K/M-derived filter is a lossy passive filter whose transfer function contains significant poles and zeroes in the 5-domain. This is in contrast to widely used forms of active filters such as Butterworth and Chebyschev whose transfer functions contain only significant poles in the 5-domain. A minimum set of linear differential equations requiring no derivatives or integrals of the input function is derived from the corresponding electrical circuit diagram.

COM-75-50308/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Accuracy Considerations in the Measurement of the Power Gain of a Large Microwave Antenna.
Final rept.,
Motohisa Kanda. Jun 74, 3p
Pub. in Proceedings of 1974 International IEEE/AP-S Symposium, Atlanta, Ga., 10-12 Jun 74, Paper in 1974 International IEEE/AP-S Symposium Digest, p43-45 Jun 74.

Descriptors: *Microwave antennas, Power gain, Measurement.
Identifiers: Reprints.

Accuracy considerations in the measurement of the power gain of a large microwave antenna are discussed. Using the gain comparison method with a standard antenna of approximately 40-dB gain, a large antenna with a power gain of approximately 60-dB can be calibrated to within an error of 0.17 dB.

COM-75-50330/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Pulse Shaper.
Final rept.,
Peter L. M. Heydemann. Mar 75, 2p
Pub. in Review of Scientific Instruments, Notes, v46 n3 p329-330 Mar 75.

Descriptors: *Shift registers, Shaping, Pulse generators, Switching.
Identifiers: Reprints.

The rounding of pulses is a convenient way to suppress transients when rf signals are switched with balanced mixers or semiconductor switches. The use of a serial-in, parallel-out shift register for shaping the leading and trailing edges of pulses is described. The original pulse is clocked through a shift register and the outputs of the register ae weighted and added to form a new pulse. The maximum rise time is equal to the clock period times the bit-capacity of the register.

COM-75-50339/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Planar Near-Field Measurements on Phased Array Antennas.
Final rept.,
Allen C. Newell, and Myron L. Crawford. Jun 74, 1p
Pub. in Proceedings of International IEEE AP-S Symposium, Atlanta, Ga., 10-12 Jun 74, Paper 6-7 in 1974 International IEEE/AP-S Symposium Digest, p423 Jun 74.

Descriptors: *Phased arrays, Antennas, Electromagnetic fields, Measurement.
Identifiers: Near field, Reprints.

The results of applying the planar near-field measurement technique to two experimental phased array antennas are described. Fast and efficient tests are used to determine the required scan area and data point spacings. The use of these tests enable one to reduce the amount of data required for some antennas without seriously increasing the errors in computed far-field parameters. Measurements were made at different distances from the antennas, with the probe transmitting and receiving, and for both sum and monopulse difference patterns of the test antenna. Comparisons between the far-field patterns computed from the near-field data and those measured on far-field ranges are presented.

PAT-APPL-10 529/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Analog-to-Pulse Integrating Converter.
Patent Application,
Everett E. Chapman. Filed 27 Mar 75, 9p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Analog to digital converters, Patents, Pulse integrators.
Identifiers: *Patent applications, PAT-CL-328-114.

The patent application describes an analog-to-pulse integrating converter which uses dual slope integration to achieve DC voltage to pulse rate conversion. An input signal is integrated, the integrator output is level detected and the integrator reset, at the same time there is issued an output pulse. The output pulse rate is proportional to the level of the DC input signal.

PAT-APPL-487 849/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Apparatus for the Generation of A High - Capacity Chirp-Z Transform.
Patent Application,
Jeffrey M. Speiser. Filed 11 Jul 74, 25p Rept no.

Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Signal processing, Radar signals, Sonar signals, Electroacoustic transducers, Patents.
Identifiers: PAT-CL-222-146-2, *Chirp Z transform, *Patent applications.

The patent application describes an apparatus for performing a high-capacity two-dimensional, chirp-z transform, suitable for the signal processing of radar and sonar signals.

PAT-APPL-556 986/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Low Temperature Low Noise SOS Mosfet Amplifier.
Patent Application,
Ram S. Roner. Filed 10 Mar 75, 13p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Transistor amplifiers, Patents, Field effect transistors, Metal oxide semiconductors, Low noise, Low temperature, Silicon, Substrates, Sapphire.
Identifiers: Silicon on sapphire, *Patent applications, PAT-CL-330-12.

The patent application describes a MOSFET amplifier apparatus capable of operating with low noise levels at low temperatures. The amplifier apparatus is totally self-biased and integrally contains all required lines and cross-over connections.

PAT-APPL-561 962/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Self-Adjusting Digital Notch Filter.
Patent Application,
Rainer F. McCown. Filed 25 Mar 75, 9p Rept no.

Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Bandstop filters, *Digital filters, Patents, Setting(Adjusting), Self operation.
Identifiers: *Patent applications, PAT-CL-340-3-146-2.

The patent application relates to digital filter auto-adjustment to variations in input signals achieved by normalizing the output of the second of two substantially identical series-connected digital filter stages and subtracting the normalized output of the second filter stage from its input to provide a measure of filter signal residue power. Deviations of the signal residue power from the preset limits of a signal residue power standard are detected and signals responsive thereto are used to appropriately adjust variable bandwidth constants in both filter stages.

PATENT-3 877 014 Not available NTIS
Department of the Air Force Washington D C
Wide Scan Angle Antenna Utilizing Surface Wave and Multiple Element Array Modes of Operation.
Patent,
Robert J. Mailloux. Filed 14 Nov 73, patented 8 Apr 75, 6p Rept nos. PAT-APPL-415 895,
Supersedes AD-164 691.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Antenna arrays, *Patents, Phased arrays, Multimode, Wide angles, Scanning, Beam steering, Surface waves.
Identifiers: End fire antennas, PAT-CL-343-730.

The patent describes an antenna capable of 180 degrees scan with improved gain characteristics at end-fire realized by combining multiple element array and surface wave antenna structures. An end-fire feed element is positioned to radiate along a column array of antenna elements. A transmitter is switched to feed either the end-fire feed elements or the column array of antenna elements and the column array antenna elements are short circuited during end-fire operation.

PATENT-3 877 030 Not available NTIS
Department of the Air Force Washington D C
Multiport Multimode Slot Antenna.
Patent,
Niles A. Walker, and Carlton H. Walter. Filed 1 Aug 73, patented 8 Apr 75, 9p Rept nos. PAT-APPL-384 531,
Supersedes AD-164 527.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Slot antennas, *Patents, Multimode, Beam steering, Antenna radiation patterns.
Identifiers: PAT-CL-343-768.

The patent describes a slot antenna apparatus for exciting higher order modes to obtain beam scanning and pattern control with a relatively small aperture.

PATENT-3 877 031 Not available NTIS
Department of the Air Force Washington D C
Method and Apparatus for Suppressing Grating Lobes in an Electronically Scanned Antenna Array.
Patent,
Robert J. Mailloux, and Allan C. Schell. Filed 29 Jun 73, patented 8 Apr 75, 12p Rept nos. PAT-APPL-374 830,
Supersedes AD-164 678.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Phased arrays, *Patents, Antenna arrays, Antenna lobes, Suppression.
Identifiers: PAT-CL-343-778.

The patent relates to grating lobe suppression in an electronically scanned antenna array realized by adding odd mode power to the fundamental even mode power that normally drives each radiating element of the array. The odd mode power is maintained plus or minus 90 degrees out of phase with the even mode power at each radiating element aperture. The ratio of even mode power to odd mode power is varied as a function of main beam displacement from broadside. One class of circuit for automatically accomplishing the required functions utilize waveguide power dividers and phase shifters. An alternative embodiment comprehends the use of passive, reciprocal linear circuitry to perform the power division. In some circuits the phase difference between adjacent radiating elements is used to derive odd and even mode signals.

PATENT-3 879 682 Not available NTIS
Department of the Air Force Washington D C
Electronic Tuning System for High Power Cavity Oscillators.
Patent,
Earl E. Swartz, and Domenick P. Viterisi. Filed 12 Jun 74, patented 22 Apr 75, 8p Rept nos. PAT-APPL-478 552,
Supersedes AD-164 858.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Tuning devices, *Patents, Cavity resonators, Oscillators, High power.
Identifiers: PAT-CL-331-96.

The patent relates to an inductive loop inserted through the cavity wall into the cavity of a cavity tuned high power oscillator. The inductive loop is terminated in a PIN diode whose characteristics, and the resulting inductive reactance presented by the loop to the cavity, are controlled by a direct current bias voltage applied across the diode. Changes in the inductive reactance of the loop changes the inductance of the cavity and hence the tuned frequency of the oscillator.

PATENT-3 880 723 Not available NTIS
Department of the Air Force Washington D C
Method of Making Substrates for Microwave Microstrip Circuits.
Patent,
Clyde H. Lane. Filed 28 Aug 73, patented 29 Apr 75, 4p Rept nos. PAT-APPL-392 378,
Supersedes AD-164 493.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Substrates, *Patents, Strip transmission lines, Microwave equipment, Photomasking, Plasma spraying, Fabrication.
Identifiers: PAT-CL-204-12, Photoresist techniques.

The patent describes utilizing photo resist techniques to apply a microstrip circuit to a soluble or etchable substrate having a thin film conductor on at least one surface. After formation of the circuit the photo resist is removed, and the circuit arc-plasma sprayed, sub-

sequently, the original substrate is removed. Another embodiment causes the area from which the original substrate has been removed to be arc-plasma sprayed thereby causing the circuit to be encapsulated. Another embodiment plates the outside surface of the encapsulated circuit to achieve a TEM mode of propagation.

PATENT-3 881 157 Not available NTIS
Department of the Air Force Washington D C
Two-Coupler Microwave Frequency Discriminator with Internal Adjustable Delay Line.
Patent,
Robert L. McLaughlin. Filed 28 Mar 74, patented 29 Apr 75, 3p Rept nos. PAT-APPL-455 768,
Supersedes AD-164 748.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Discriminators, *Patents, Microwave equipment, Delay lines, Carrier waves, Strip transmission lines, Waveguide couplers, Tuning devices.
Identifiers: PAT-CL-329-116.

The patent describes a two-coupler microwave frequency discriminator having an adjustable delay line. The signal to be demodulated is fed to one of the input ports of a 3 db coupler and its inphase output is fed to a fixed external delay while the quadrature output is fed to an internal adjustable delay line. The two delay circuits are fed to the input ports of a second 3 db coupler and the outputs thereof are connected one each to matched detecting diodes. A pair of video amplifiers are each fed by both diodes producing an amplified modulated signal and a frequency modulated signal. The internal adjustable delay line includes a pair of printed circuit boards opposing each other with one fixed in the housing and the other slidably mounted within the housing and driven longitudinally by an attached slide screw that protrudes to the outside of the housing.

9F. Telemetry

AD-A011 217/7GA PC$3.25/MF$2.25
Army Electronics Command Fort Monmouth N J
A Logarithmic Response Resistor-Capacitor Telemetry Modulator.
Technical rept.,
Nelson Buck. Apr 75, 24p Rept no. ECOM-5561

Descriptors: *Radiosondes, *Telemeter systems, *Modulators, Rocketborne, Thermistors, Sounding rockets, Detectors, Atmospheric sounding, Atmospheric temperature.

A unique electronic circuit has been developed for use in a rocket-borne temperature sonde to convert a thermistor resistance to a modulation frequency for telemetry application. The modulator's frequency versus resistance curve drifts less than 4% as the temperature of the electronics varies from +60C to -60C. The drift is easily corrected by including a reference circuit in the sonde. The modulator can be made almost entirely insensitive to power supply voltage changes, and can be made to dissipate less than 0.1-microwatt power in the thermistor without degrading resolution, temperature stability, or voltage stability. Because it passes alternating current through the thermistor, it possesses a nearly logarithmic frequency versus resistance curve with a resistor-capacitor (R-C) network instead of a transistor.

PAT-APPL-565 290/GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Telemetry Synchronizer.
Patent Application.
C. T. Pardoe. Filed 4 Apr 75, 39p NASA-CASE-GSC-11868-1
Subm-Sponsored by NASA.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Signal processing, *Synchronizers, *Telemetry, Delay circuits, Digital techniques, *Patent applications.

A telemetry data synchronizer for achieving phase lock and synchronization of an input signal having a pseudorandom sequence is presented. The apparatus is characterized by a delay lock loop adapted to be responsive to an L format biphase signal having a pseudorandom sequence and utilizing only digital circuitry.

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

COM-75-10749/0GA PC$7.25/MF$2.25
Stanford Research Inst., Menlo Park, Calif. Center for the Study of Social Policy.
Plausibility of a Restricted Energy Use Scenario.
Research rept.,
Joe E. Armstrong, and Willis W. Harman. 8 Jan 75, 211p* CSSP-3705-8
Contract C-5-35546
Report to Panel on Project Independence Blueprint.

Descriptors: *Energy conservation, *Government policies, *Energy policy, Energy demand, Taxes, Assessments, Economic analysis, Scenarios, Energy consumption, National government, Coal, Natural gas, Crude oil, Electricity, Forecasting, Models, Econometrics, Industries, Residential buildings, United States.
Identifiers: Project Independence.

The report explores consequences of high and modest scenario projections of energy usage in the United States with and without adoption of modest energy conservation measures. The objectives of the overall study are: (1) to establish the plausibility that for a variety of reasons the United States may choose or find itself forced to accept at some point in the future a low or even static growth in energy usage; (2) to explore the validity of the use of past trends and inter-element relationships for the economic, social, and technical projections up to and beyond 1990; and (3) to assess the feasibility of key characteristics of a comprehensive energy conservation plan.

N75-22901/3GA PC$3.25/MF$2.25
TRW Systems, Redondo Beach, Calif.
Technology Assessment of Portable Energy RDT and p, Phase 1.
Executive Summary Report.
J. R. Spraul. 7 Apr 75, 13p NASA-CR-137654
Contract NAS2-8445

Descriptors: *Aircraft fuels, *Energy policy, *Energy sources, *Technology assessment, Air transportation, Research and development, Synthetic fuels, Transportation energy.

For abstract, see STAR 1314

N75-22902/1GA PC$7.50/MF$2.25
TRW Systems, Redondo Beach, Calif.
Technology Assessment of Portable Energy RDT and p, Phase 1.
Final Report.
J. R. Spraul. 7 Apr 75, 240p NASA-CR-137653
Contract NAS2-8445

Descriptors: *Aircraft fuels, *Energy policy, *Energy sources, *Synthetic fuels, *Technology assessment, Air transportation, Coal utilization, Cost analysis, Social factors, Solar energy, Transportation energy.

For abstract, see STAR 1314

N75-22904/7GA PC$10.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Wind Engines and Wind Installations.
Y. M. Fateyev. Mar 75, 391p NASA-TT-F-16170
Contract NASW-2481
Tran-Transl. Into English of the Book "Vetrodvigateli I Vetroustanovki" Moscow, State Publishing House of Agricultural Literature, 1948 p 1-544.

Descriptors: *Wind tunnels, *Windpower utilization, *Windpowered pumps, Aerodynamic characteristics, Design analysis, Maintenance.

For abstract, see STAR 1314

PB-241 990/1GA PC$4.25/MF$2.25
Dow Chemical Co., Freeport, Tex. Texas Div.
Energy Consumption: The Primary Metals and Petroleum Industries.
Final rept. Aug 74-Mar 75,
John T. Reding, and Burchard P. Shepherd. Apr 75, 59p* EPA/650/2-75-032-b
Contract EPA-68-02-1329

Descriptors: *Energy consumption, *Petroleum industry, *Aluminum industry, *Steel plants, Metal industry, Electrolysis, Distillation, Insulation, Furnaces, Design, Fuel consumption, Electric power demand, Energy conservation, Heat recovery, Industries.
Identifiers: SIC 33, SIC 29, Electric power consumption.

The report gives results of a study of energy consumption in the primary metals and petroleum industries. It analyzes energy-intensive steps or operations for commonly used manufacturing processes. Results of the analyses are in the form of energy consumption block diagrams, energy-intensive equipment schematic diagrams, and tables that indicate the causes of energy losses, as well as possible conservation approaches.

PB-242 142/8GA PC$4.25/MF$2.25
Massachusetts Inst., of Tech., Cambridge. Energy Lab.
Project Independence Report: A Review of U.S. Energy Needs Up to 1985,
Jerry A. Hausman. Apr 75, 60p MIT-EL-75-009

Descriptors: *Energy demand, Crude oil, Natural gas, Coal, Nuclear energy, Nuclear power, Electric power demand, Fuel consumption, Cost estimates, Forecasting, Models.
Identifiers: *Project Independence, *Energy forecasts.

A review and assessment of the Federal Energy Administration's Project Independence Report is undertaken. Special emphasis is placed on the energy mode (PIES) and its forecast of U.S. energy needs up through 1985. Biases are pointed out and the uncertainty of the final result is emphasized.

PB-242 189/9GA PC$8.75/MF$2.25
Mitre Corp., Bedford, Mass.
A Systems Approach to Innovative Solutions to the Energy Problem.
Final rept.,

Phillip R. Vance. Dec 73, 279p NSF/RA/R-73-008, NSF/RDIn8
Grant NSF-DI-39519
Report on An Experiment in Incentives.

Descriptors: *Energy, Energy conservation, Energy policy, Energy management, Objectives, Planning, Research projects, Cost control, Systems analysis, Systems engineering, Electric utilities, New England.
Identifiers: New England Energy Development Systems Center, Cost sharing.

This report covers the results of the first year activities of the New England Energy Development Systems (NEEDS) Center, established under a grant to the MITRE Corporation. The report describes the formation of this new institutional mechanism, whose objectives are to increase the level of non-Federal support for energy-related research and development, to stimulate the innovation process, and to facilitate the transition of R&D products from laboratory to operational use. The report defines R&D project activities undertaken in cooperation with research directors of the three largest electric utilities, public officials and university experts in New England. They include problems of fossil fuel supply-demand management, small-scale energy options, and fuel switching systems. In addition, four R&D programs to be funded by utilities are identified and described. Operational and pending agreements for cost-sharing of the R&D by appropriate companies are cited, as are criteria for the measurement of the impact of the efforts undertaken in this experiment in cooperative research and development.

PB-242 217/8GA PC$8.75/MF$2.25
Stein (Richard G.) and Associates, New York.
Research Design Construction and Evaluation of a Low Energy Utilization School, Research Phase 1.
Interim rept.,
Richard G. Stein, and Carl Stein. 15 Aug 74, 297p NSF/RA/N-74-117
Grant NSF-GI-39612

Descriptors: *Schools, *School buildings, *Energy conservation, Electricity, Electric power demand, Fuel consumption, Hot water heating, Space heating, Illuminating, Air cooling, Ventilation, Solar space heating, Air conditioning, Solar water heaters, Tables(Data), Prototypes, Design, New York.
Identifiers: Electric power consumption, New York City(New York).

Substantial energy savings can be achieved in schools. These findings, substantiated in this report, are based on a re-examination of the education determinants that have influenced energy consumption in the past, and on a review of the technical performance of the building components. Since educational buildings represent 7 percent of the building area in total U.S. construction, these savings are considerable. In all, with recommended new standards, schools can be five to fifty percent below the already carefully monitored New York City level.

10B. Power Sources

N75-22345/3GA PC$4.75/MF$2.25
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
Application of Electrohydrodynamic Phenomena to Space Processing.
Final Report.
T. B. Jones. Mar 75, 78p NASA-CR-120445
Contract NAS8-30250

Descriptors: *Electrohydrodynamics, *Space manufacturing, *Technology transfer, Low gravity manufacturing, Product development.

For abstract, see STAR 1314

N75-22583/9GA PC$6.25/MF$2.25
Teledyne Brown Engineering, Huntsville, Ala. Electronics and Engineering.
Standardized Multiple Output Power Supply.
Final Report.
E. V. Ragusa. Apr 75, 152p NASA-CR-120743, EE-MSFC-1888
Contract NAS8-29770

Descriptors: *Direct power generators, *Electric equipment tests, *Spacecraft power supplies, Equipment specifications, Feedback control, System effectiveness.

For abstract, see STAR 1314

N75-22584/7GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
A Direct Voltage Converter Without Transformer.
T. Kuzmiszkina, and A. Matusewicz. 1975, 16p NASA-TT-F-16174
Contract NASW-2481
Tran-Transl. Into English from Przeglad Telekomunikacyjny (Poland), V. 46, No. 1, 1973 p 23-28.

Descriptors: *Direct power generators, *Energy conversion, Electronic equipment, Power efficiency.

For abstract, see STAR 1314

N75-22906/2GA PC$5.75/MF$2.25
General Electric Co., Cincinnati, Ohio.
Potassium Topping Cycles for Stationary Power.
Final Report.
R. J. Rossbach. Mar 75, 130p NASA-CR-2518, GESP-741
Contract NAS3-17354

Descriptors: *Design analysis, *Electric power plants, *Energy policy, Boilers, Clean energy, Cost estimates, Energy conservation, Fluidized bed processors, Furnaces.

For abstract, see STAR 1314

PAT-APPL-571 458/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Photovoltaic Cell Array.
Patent Application.
J. T. Eliason. Filed 25 Apr 75, 9p NASA-CASE-MFS-22458-1
Subm-Sponsored by NASA.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Photovoltaic cells, *Solar cells, *Solar energy, *Solar generators, Energy absorption films, *Patent applications, Semiconductor junctions, Silicon.

A construction technique for making high density solar cell arrays at lowered costs is presented. Closely spaced filaments of silicon are prepared to have a continuous layer-type semiconductor junction formed by creating an internal P-type conductivity region and outer N-type conductivity region. Electrical output connections are made to the P and N layer regions by means of P bus members and N bus members. The filaments of silicon and connecting buses are appropriately woven to form what is regarded as a solar cell blanket with an effective density of 100 to 1,000 photocells per square inch.

PB-242 151/9GA PC$4.75/MF$2.25
Massachusetts Univ., Amherst. Energy Alternatives Program.
Hot Water Hydraulics of the Gulf Stream Sited OTGM,
Daniel Seluk, and Robert H. Kirchhoff. Mar 75, 76p NSF/RANN/SE/GI-34979/TR/75/2 NSF/RA/N-75-027
Grant NSF-GI-34979

Descriptors: *Solar sea power plants, *Gulf stream, Hydrodynamics, Fluid flow, Kinetic energy, Potential energy, Rankine cycle, Pressure gradients, Boilers, Turbines, Heat exchangers, Condensers(Liquefiers), Evaporators, Momentum, Heat recovery, Feasibility, Mathematical models, Computerized simulation, Computer programs.
Identifiers: SIMPRO computer program.

This report is the result of a study to determine if the kinetic energy of the Gulf Stream can be used as a pump for the evaporators in an OTES. The proposed evaporator is of the plate fin heat exchanger type but calculations for the staggered tube type boiler have also been developed. The flow field for both types of evaporators is assumed to be similar to that of a screen submerged in an infinite two dimensional potential flowfield. The problem is then reduced to determining the pressure loss coefficient for each arrangement. Momentum and thermal recovery in the wake of ocean pumped plants are investigated, and graphs are presented to allow the determination of downstream plant spacing.

PB-242 167/5GA PC$9.25/MF$2.25
Hawaii Univ., Honolulu. Dept. of Ocean Engineering.
An Evaluation of Oceanographic and Socio-Economic Aspects of a Nearshore Ocean Thermal Energy Conversion Pilot Plant in Subtropical Hawaiian Waters.
Final rept. 1 May 74-31 Jul 75,
Karl H. Bathen. 30 Apr 75, 312p
NSF/RANN/SE/AER74-17521-A01/FR/75/2
NSF/RA/N-75-028
Grant NSF-AER74-17521-A01

Descriptors: *Solar sea power plants, *Environmental impacts, Thermal power plants, Social effect, Economic effects, Thermodynamics, Thermal diffusion, Heat transfer, Heat storage, Salinity, Plankton blooms, Law(Jurisprudence), International relations, Government policies, National government, State government, Bathymetry, Ocean currents, Socioeconomic status, Licenses, Water pollution, Site surveys, Planning, Pilot plants, Hawaii, Feasibility.
Identifiers: Socioeconomic profiles, Kona district(Hawaii), Keahole Point(Hawaii).

Ocean thermal energy conversion (OTEG) proof-of-concept/pilot plant studies in subtropical waters are discussed. The three-part socio-economic program was concerned with examining the legal aspects of a nearshore OTEC plant. The applicable law, federal interests, licenses and permits, opposing interests, legislative experience and site considerations were considered. An attempt was made to characterize the existing socio-economic conditions in the Kona (Keahole) area by examining the social infrastructure, local population, labor force, income and education, Konal electrical demand, and potential impact of a new power source. An input-output analysis for the Kona area was completed to model and further predict the impact of a new energy source on the economy of Hawaii County.

PB-242 589/2GA PC$3.75/MF$2.25
Massachusetts Univ., Amherst.
An Analysis of the Fluid Motion into the Condenser Intake of a 400 MW(E) Ocean Thermal Difference Power Plant,
Peter A. Mangarella. Mar 75, 27p
NSF/RANN/SE/GI-34979/TR/75/3 NSF/RA/N-75-029
Grant NSF-GI-34979

Descriptors: *Solar sea power plants, Hydrodynamics, Water flow, Flow measurement, Thermoclines, Stratification, Temperature, Flow rate, Density, Ocean bottom, Sea water, Gulf stream.

The report addresses the following questions regarding the operation of an intake device in a complex stratified flow typical of the Gulf Stream: (1) would flow into such an intake create disruption of the thermocline if placed in depths of the order of 300-800 meters thereby withdrawing warm surface waters which would adversely affect the condenser operation, (2) if a finite withdrawal layer is created by such a device, what is the size and configuration of that layer as a function of ambient conditions (density stratification and current speed), intake operating characteristics (principally flow rate) and intake geometry (diameter and depth of intake), (3) what is the effect of such a withdrawal layer on the average temperature of the water so withdrawn, and can this average temperature by predicted, (4) what is the possibility of entraining botton deposits from such an intake device and can some criteria be developed for avoiding scouring.

10C. Energy Storage

AD-A011 277/1GA PC$3.75/MF$2.25
Argonne National Lab Ill
Evaluation of Electrolytes for Direct Oxidation Hydrocarbon/Air Fuel Cells.
Final technical rept. Jan 73-Jun 74,
John P. Ackerman, and Robert K. Steunenberg.
Jan 75, 30p
See also report dated 74, AD/A-002 578.

Descriptors: *Electrolytes, Electrodes, Polymers, Tin compounds, Experimental design, Adsorption, Solid electrolytes, Phosphoric acids, Performance(Engineering).
Identifiers: *Fuel cell electrolytes, *Hydrocarbon air fuel cells, Methane sulfonic acid/trifluoro, Stibonic acid/hexafluoro.

This program consisted of research studies on electrolytes for direct-oxidation hydrocarbon/air fuel cells, the objective being to find an electrolyte in which the rate of electrooxidation of propane is greater than that obtained using orthophosphoric acid at 140C as the electrolyte. Baseline data that were obtained at 104 and 140C with 95-97% orthophosphoric acid were in agreement with the results of other workers using this electrolyte. Experiments with trifluoromethanesulfonic acid showed it to be a promising electrolyte; however, the physical properties of its monohydrate (which is the actual form of the electrolyte) need to be investigated more thoroughly. Hexafluorosphosphoric acid was evaluated for possible use, but was rejected because it was not invariant, in that hydrogen fluoride was evolved rapidly during the tests. Hexafluorostibonic acid showed similar behavior, with evolution of fumes at temperatures of 85-90C, but at a much lower rate. Consideration was given to the possible use of bistrifluoromethylphosphinic acid as an electrolyte. A brief study was made of solid polymer electrolytes for the hydrocarbon fuel cell application. On the basis of these investigations, trifluoromethanesulfonic acid appears to be the most promising new electrolyte for direct oxidation hydrocarbon/air fuel cells.

PAT-APPL-563 010/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Metal-Gas Battery with Axial Reactant Gas Storage Cavity.
Patent Application,
Don R. Warnock. Filed 27 Mar 75, 16p Rept no.

Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Electric batteries, Patents, Metals, Gases, Pressure vessels, Nickel, Hydrogen, Battery components.
Identifiers: Metal gas batteries, *Patent applications, *Nickel hydrogen batteries, PAT-CL-136-86.

Metal-gas batteries (such as a nickel-hydrogen or silver-hydrogen) are well known. The patent application provides a novel compact cell and battery structure wherein the cell components are in the form of annuli of thin rectangular cross sections (like a large, flat, round washer), and the cell components are stacked along a common central axis to provide a cell that is also in the shape of an annulus having a rectangular cross section. The reactant gas storage is substantially within the geometric envelope of the cell (and battery) component stack and a common reactant gas volume along the axis in the hollow center of the stack is used by a plurality of cells by having each cell separated from the common gas storage volume by a hydrophobic non-wetting porous plastic membrane which provides for the free flow of the reactant gas from the axial storage cavity into the individual cells but which prevents the passage of any electrolyte from the cell.

PATENT-3 879 228 Not available NTIS
Department of the Air Force Washington D C
Photo-Regenerative Electrochemical Energy Converter.
Patent,
Ignatius E. Theodorou, and Richard Payne.
Filed 6 Mar 72, patented 22 Apr 75, 5p Rept nos. PAT-APPL-232 028,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Electric batteries, Electrolytes, Photovoltaic effect, Electrolytic cells.
Identifiers: *Photovoltaic cells, PAT-CL-136-206.

The patent describes a photoelectrochemical device for converting incident radiation energy to electrical energy through the use of a photochemically reversible galvanic cell. Basically, the device is constructed of a sealed transparent container into which is placed a chemically inert anode coated with a photoresponsive material and a chemically inert cathode. A compatible electrolytic solution is also disposed within the container and provides a conductivity path across the electrodes to complete the electrochemical circuit. Decomposition of the photo-responsive material is induced by incident radiation passing through the transparent container. The products of the photo reaction recombine electrochemically by passing an electric current through a resistance load connected externally to the anode and the cathode.

11. MATERIALS

11B. Ceramics, Refractories, and Glasses

AD-A011 467/8GA PC$3.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Controlled Surface Flaws in Hot-Pressed Si3N4,
J. J. Petrovic, L. A. Jacobson, P. K. Talty, and A. K. Vasudevan. 17 Jun 74, 6p Rept no. ARL-75-0211
Availability: Pub. in Jnl. of the American Ceramic Society, V58 n3-4 Mar-Apr 75.

Descriptors: *Silicon nitrides, *Fracture(Mechanics), Bending, Stress analysis, Residual stress, Annealing, Crack propagation, Hot pressing, Surface properties, Cracks, Control, Reprints.

Surface flaws of controlled size and shape were produced in high-strength hot-pressed Silicon Nitride with a Knoop microhardness indenter. Fracture was initiated at a single suitably oriented flaw on the tensile surface of a 4-point-bend specimen, with attendant reduction in the measured magnitude and scatter of the fracture strength. The stress required to propagate the controlled flaw was used to calculate the critical stress-intensity factor, K(IC), from standard fracture mechanics formulas for semielliptical surface flaws in bending. After the bend specimen had been annealed, the room-temperature K(IC) values for HS-130 Silicon Nitride increased to a level consistent with values obtained from conventional fracture-mechanics tests. It was postulated that annealing reduces the residual stresses produced by the microhardness indentation. The presence of residual stresses may account for the low K(IC) values. Elevated-temperature K(IC) values for HS-130 Silicon Nitride were consistent with double-torsion data. Controlled flaws in HS-130 Silicon Nitride exhibited slow crack growth at high temperatures. (Author)

COM-75-10763/1GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Inorganic Materials Div.
Strength Degradation of Brittle Surfaces: Sharp Indenters.
Interim rept. 1 Jul 74-30 Jun 75,
B. R. Lawn, E. R. Fuller, and S. M. Wiederhorn.
May 75, 39p NBSIR-75-661
Sponsored in part by Office of Naval Research, Arlington, Va. See also report dated Feb 75, AD-A007 447.

Descriptors: *Ceramic materials, *Fractures(Materials), Surface properties, Test equipment, Brittleness, Mathematical models, Crack propagation, Hardness, Residual stress, Friction.
Identifiers: Indenter's.

A theory of strength loss for brittle surfaces in contact situations developed in a previous paper for 'blunt' indenters, is here extended to the case of 'sharp' indenters. A prior fracture mechanics analysis of crack growth beneath ideal cone indenters serves as the basis for predetermining the prospective surface degradation of ceramic components in service. The effect of indenter 'sharpness' and initial specimen surface flaw state are investigated systematically, along with some secondary rate effects in the contact process. The possibility of minimizing degradation via adjustment of material parameters (including hardness) or surface condition (e.g., residual stresses, frictional properties) is briefly discussed.

COM-75-50372/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Reinforced Polycarboxylate Cements.
Final rept.,
J. A. Barton, Jr., G. M. Brauer, J. M. Antonucci, and M. J. Raney. 1975, 14p
Grant PHS-DE-40015
Pub. in Jnl. of Dental Research, v54 n2 p310-323 1975.

Descriptors: *Dental materials, *Acid bonded reaction cements, Polyacrylic acid, Composite materials, Copolymers, Mechanical properties, Polybasic organic acids.
Identifiers: Reprints.

Polycarboxylate cements consisting of zinc oxide mixed with aq. poly(acrylic acid) or polycarboxylic acid copolymers have found a number of dental applications. Incorporation of stainless steel, alumina, silver-tin powder, and especially high modulus fibers such as potassi-

um titanate or graphite, improves mechanical properties. Preferred compositions contain 4 to 12% graphite or 20 to 30% potassium titanate. The compressive strength of composite cements based on acrylic-itaconic acid copolymers and acrylic-itaconic-aconitic acid terpolymers synthesized in this laboratory, and containing potassium titanate as reinforcing agent, is doubled and the tensile strength is increased two and one-half times over that of commercial products. Other desirable properties such as ease of mixing, adhesion to metal substrates, low dimensional change on storage in water and low thermal expansion were not changed by addition of fibers.

N75-22344/6GA PC$3.75/MF$2.25
IIT Research Inst., Chicago, Ill.
Space Processing of Chalcogenide Glasses.
Annual Report, 22 Feb. 1974 - 21 Feb. 1975.
D. C. Larsen, and M. A. Ali. 15 Apr 75, 40p
NASA-CR-120745, AR-1
Contracts NAS8-30627, IITRI PROJ. D6096

Descriptors: *Chalcogenides, *Glass, *Manufacturing, *Orbital workshops, Arsenic compounds, Containerless melts, Hot pressing, Infrared scanners, Optical waveguides, Sulfides, Waveguide windows.

For abstract, see STAR 1314

N75-22385/9GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Interaction of Graphite and Ablative Materials with CO2-Laser, Carbon-Arc, and Xenon-Arc Radiation.
M.S. Thesis - George Washington Univ., Washington, D. C.
W. D. Brewer. May 75, 81p NASA-TM-X-68726

Descriptors: *Ablative materials, *Charring, *Graphite, *High temperature tests, Carbon arcs, Carbon dioxide lasers, Heat shielding, Microstructure, Radiative heat transfer.

For abstract, see STAR 1314

PATENT-3 880 638 Not available NTIS
Department of the Air Force Washington D C
Thermal Tempering of Non-Oxide Glass Compositions.
Patent,
Harold C. Hafner, and Andre E. Tilton. Filed 21 Dec 73, patented 29 Apr 75, 5p Rept nos. PAT-APPL-427 285,
Supersedes AD-164 707.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Infrared optical materials, *Glass, *Patents, Tempering, Windshields, Aircraft, Germanium, Selenium, Antimony, Arsenic.
Identifiers: PAT-CL-65-116.

The patent presents a method for tempering non-oxide glasses. These glasses have a composition containing germanium, selenium and a third element consisting of antimony, arsenic, iodine, gallium, mercury, and tellurium. The use of these systems for airborne applications is important for high speed high altitude aircraft windows.

11C. Coating, Colorants, and Finishes

AD-A011 274/8GA PC$4.25/MF$2.25
Battelle Columbus Labs Ohio
Analysis of Buoy Coating Specimens Exposed in Seawater at Daytona Beach, Florida.
Final rept.,
R. J. Dick, B. J. Merrell, L. J. Nowacki, and J. R. Sherrard. 21 Mar 75, 60p Rept no. BATT-PPC-44 USCG-D-74-75
Contract DOT-CG-51331-A

Descriptors: *Antifouling coatings, Sea testing, Life expectancy, Buoys, Performance(Engineering), Test methods, Substrates, Toxic agents, Protective coatings, Vinyl plastics.
Identifiers: DOT/5E, DOT/4BZ/BE, Performance evaluation.

Eighteen premium antifouling marine coatings systems are being examined to determine extended service life potential. Premium systems were selected to contain combinations of (1) substrate, (2) pretreatments, (3) anticorrosive tiecoats, (4) antifouling topcoats, and (5) toxicants. Seawater immersion studies include both dynamic and static exposures. The performances of Type 121/63 and Type 121 vinyl-rosin controls and a proprietary elastomeric sheet with organotin toxicant have been rated 'outstanding'. Self-cure and postcure zinc primers with high-build vinyl anticorrosive and vinyl-rosin topcoats are rated 'excellent'. All of these five systems may meet the original 5-year performance goal and several may continue to perform well for many years to come. Performances of seven systems have been rated 'fair to good'. Performances of six systems have been rated 'failure'.

AD-A011 645/9GA PC$3.75/MF$2.25
Air Force Materials Lab Wright-Patterson AFB Ohio
Apparatus and Techniques Used for Casting Films from Aromatic Heterocyclic Polymers.
Technical rept. Jan 71-Jun 74,
Matatiahu Gehatia, A. Wereta, and D. R. Wiff.
Apr 75, 33p Rept no. AFML-TR-74-249

Descriptors: *Polymeric films, *Casting, Heterocyclic compounds, Aromatic compounds, X ray diffraction, Structural properties, Equipment.
Identifiers: Polybenzimidazoles, Design.

Techniques have been developed to convert raw polymers into films by casting from solutions and evaporating to dryness. One instrument has been developed to form films from highly volatile solvents and another to form films from corrosive nonvolatile solvents. The latter has the capability to control temperature, environment, and other factors significant in the process of casting. Formed films underwent post-treatment, such as leaching, drying, and thermal treatment. Inducing orientation by stretching has been attempted. Film structure has been investigated with x-ray diffraction. Preliminary work included films cast from BBB, PBI, and AB-PBI polymers. Casting (high strength) PRD-49 films was attempted without success.

11D. Composite Materials

AD-A011 289/6GA PC$5.25/MF$2.25
Auburn Univ Ala Dept of Mechanical Engineering
Stability of Glass Fiber-Plastic Composites.
Technical rept.,
Wartan A. Jemian, Roy C. Wilcox, and Andrew C. T. Hsu. Nov 74, 102p RL-75-6
Contract DAAH01-73-C-0466

Descriptors: *Fiber reinforced composites, Epoxy resins, Fiberglass, Stability, Degradation, Water, Environmental tests, Structural properties.
Identifiers: *Fiberglass reinforced plastics, Epoxy matrix composites.

Exploratory research was conducted to determine the stages and nature of degradation of glass fiber-plastic composite systems under various environmental conditions. Glass fiber-epoxy structural composites have many characteristics that are desirable in Army materiel; however, they suffer appreciable losses in strength on storage in high humidity-high temperature conditions. A number of mechanical, physical and chemical tests were performed on the individual components in the system and on samples of composites made of these components. It was found that the glass filaments are a reactive component and lose their strength rapidly on direct exposure to water at elevated temperatures. Magnesium is a particularly active component. It was also found that the silane coupling agent that is incorporated in standard commercial glass finishes is a possible reactive component.

AD-A011 407/4GA PC$4.75/MF$2.25
Boeing Aerospace Co Seattle Wash Research and Engineering Div
Evaluation of Reinforced Thermoplastic Composites and Adhesives.
Final rept. 1 Apr 74-1 Feb 75,
J. T. Hoggatt, and A. D. Von Volkli. Mar 75, 100p Rept no. D180-17503-3
Contract N00019-74-C-0226

Descriptors: *Laminated plastics, *Fiber reinforced composites, *Adhesives, Reinforced plastics, Thermoplastic resins, Sulfones, Polyimide resins, Fabrics, Carbon fibers, Mechanical properties, Environmental tests, Reinforcing materials, Bonding, Aircraft, Airframes, Materials.
Identifiers: Polysulfones, Kevlar resins.

Kevlar-49 fabric laminates with polysulfone resin matrix were evaluated for mechanical and electrical properties and environmental resistance to explore its potential for secondary and primary aircraft structure. Investigations indicated Kevlar-49 reinforced thermoplastic laminates in general exhibited properties equivalent to laminates made with thermosetting matrices. Thermoplastic polymers with service temperatures in excess of +300 F were screened with three polymers being subjected to in-depth study. These polymers were 200P polysulfone (+325 F service), 720P polysulfone (+400 F service) and NR150A polyimide (+450 F service). Each material exhibited good property translation and thermal stability within the stated service temperature range. Processing conditions for the polymers were within the limitations of most commercial autoclaves. Polysulfone resin was evaluated as an adhesive and exhibited excellent adhesive properties for bonding stainless steel and composites. Values in excess of 4500 psi and 3400 psi were obtained at 70 F and +250 F, respectively, on stainless steel lap bond specimens. Composite-to-composite bonds produced values in excess of 8000 psi with a polysulfone adhesive.

AD-A011 552/7GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Applied Mechanics
Mechanical Response of Structural Elements to Dynamic Loads.
Interim scientific rept. 1 Apr 74-31 Mar 75,
George Herrmann. May 75, 12p AFOSR-TR-75-0814
Grant AF-AFOSR-2669-74

Descriptors: *Composite materials, *Dynamic loads, Structural members, Fracture(Mechanics), Shock waves, Stability, Vibration, Loads(Forces).

This report summarized the research activities carried out under the subject grant during the period 1 April 1974 to 31 March 1975. Subjects discussed are fracture mechanics, composite materials, shock waves, fluid-solid interaction, and dynamic stability.

COM-75-50364/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Low-Temperature Thermal Conductivity of Two Fibre-Epoxy Composites.
Final rept.,
J. G. Hust. Mar 75, 3p
Sponsored in part by National Accelerator Lab., Batavia, Ill.
Pub. in Cryogenics, v15 n3 p126-128 Mar 75.

Descriptors: *Reinforced plastics, *Composite materials, *Thermal conductivity, Polymers, Fibers, Fiberglass, Cryogenics.
Identifiers: Reprints, Epoxy matrix composites, Fiberglass reinforced plastics.

Thermal conductivity data are presented for two fiber-epoxy composites. The fiber in one composite is glass and an aramid-class polymer in the other. Measurements were conducted on a glass-epoxy specimen in the direction perpendicular to the fibers at temperatures from 14 to 100 K. The aramid-epoxy specimen was measured parallel to the fibers at 5, 76, 196, and 276 K. Data are presented both in graphical and tabular form.

N75-22386/7GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Investigation of the Stress-Strain State of Composite Materials with a Grid Reinforcement.
L. N. Moguchiy, and G. G. Leshkevich. Apr 75, 10p NASA-TT-F-16274
Tran-Transl. Into English from the Book "Obrabotka Davleniyem I Mekhanicheskiye Svoystva Tugoplavkikh Metallov I Splavov" Moscow, Nauka Press, 1974 p 35-39. Subm-Sponsored by NASA.

Descriptors: *Composite materials, *Reinforcing fibers, *Stress concentration, Fracture mechanics, Loads (Forces), Plastic deformation.

For abstract, see STAR 1314

N75-22387/5GA PC$7.50/MF$2.25
Hawker Siddeley Dynamics Ltd., Hatfield (England).
The Use of Carbon Fibre Reinforced Plastics in Satellite Structures. Volume 2: Technical Appendices a to D.
Final Report on Phase 2, Oct. 1973 - Dec. 1974.
Dec 74, 244p HSD-TP-7509-VOL-2-APP-A-, ESRO-CR(P)-598
Contract ESTEC-1735/72-PP
Seri-2.

Descriptors: *Carbon fiber reinforced plastics, *Mechanical properties, *Spacecraft structures, *Thermodynamic properties, Booms (Equipment), Epoxy resins, Fatigue tests, Honeycomb structures, Inserts, Joints (Junctions), Shock tests, Thermal cycling tests.

For abstract, see STAR 1314

11E. Fibers and Textiles

N75-22384/2GA PC$3.75/MF$2.25
Babcock and Wilcox Co., Augusta, Ga. Refractories Div.
Development Program to Produce Mullite Fiber Insulation.
W. G. Long. Apr 75, 39p NASA-CR-134805
Contract NAS3-16782

Descriptors: *Fibers, *Mullites, *Thermal insulation, Ceramics, Composite materials, Felts, Tensile strength, Textiles, Thermodynamic properties, Wool.

For abstract, see STAR 1314

PB-242 256/6GA PC$3.25/MF$2.25
Consumer Product Safety Commission, Washington, D.C.
Guide to Fabric Flammability.
Final rept.
Apr 75, 24p
Portions of this document are not fully legible.

Descriptors: *Fabrics, *Flammability, *Consumer protection, Accident prevention, Consumer education, Fire resistant materials, Burns(Injuries), Legislation, Fire resistant coatings, Product safety.

Technical information is provided to address the following questions: What the Federal government has done to reduce accidents involving flammable fabrics; what 'flame-retardant fabric' means; how the consumer should launder flame retardant fabrics now on the market; what factors the consumer should consider in purchasing a fabric or garment that is not flame retardant; what precautions the consumer can take to avoid a flammable fabrics accident; how burn injuries should be treated. Portions of this document are not fully legible.

11F. Metallurgy and Metallography

AD-A011 280/5GA PC$4.25/MF$2.25
United Technologies Research Center East Hartford Conn
The Response of Complex Eutectic Alloys to Directional Solidification.
Final rept. May 72-May 75,
Earl R. Thompson, and Edwin H. Kraft. May 75, 56p Rept no. R75-911345-7 ARO-9310.1-MC
Contract DAHC04-72-C-0041

Descriptors: *Eutectics, *Fiber metallurgy, Solidification, Directional, Nickel alloys, Niobium alloys, Aluminum alloys, Chromium alloys, Thermal analysis, Diffusion coefficient, Superalloys.

The influence of composition, thermal gradient and directional solidification rate on the biphase, gamma nickel + delta Ni3Cb, structure formed during crystallization was analyzed.

AD-A011 298/7GA PC$3.25/MF$2.25
Pennsylvania Univ Philadelphia School of Metallurgy and Materials Science
Structural Stability and Mechanical Properties of Amorphous Metals,
T. Masumoto, and R. Maddin. 28 Jun 74, 25p
Availability: Pub. in Materials Science and Engineering, 19 p1-24 1975.

Descriptors: *Amorphous materials, *Metals, Stability, Mechanical properties, Atomic structure, Thermal stability, Deformation, Elastic properties, Fracture(Mechanics), Ductility, Toughness, Fatigue(Mechanics), Reprints.

Studies of the mechanical properties of amorphous metals that have only relatively recently been reported were made primarily on account of the development of new quenching techniques that produce sizeable specimens uniform enough for such studies. As a result, amorphous metals have generated renewed interest because their physical, mechanical and chemical properties exhibit characteristics of both fundamental and practical interest. The purpose of this review is to present new information concerned with the structural stability and mechanical properties obtained, for the most part, by research groups at The Institute for Iron, Steel and other Metals in Sendai, Japan and at the University of Pennsylvania. It is also of interest to consider possible applications of this class of materials and to aim at developing new and improved varieties as well as advancing our basic understanding of their properties.

AD-A011 333/2GA PC$3.25/MF$2.25
Rockwell International Corp Thousand Oaks Calif Science Center
Metastable Grain Boundary Segregation in Copper Containing Tellurium,
H. Marcus, and N. Paton. 4 Sep 73, 5p AFOSR-TR-75-0757
Contract F44620-71-C-0059
Availability: Pub. in Metallurgical Transactions, v5 p2135-2138 Oct 74.

Descriptors: *Copper, *Tellurium, *Grain boundaries, Segregation(Metallurgy), Aging(Materials), Auger electron spectroscopy, Chemical precipitation, Reprints.

Evidence for metastable grain boundary segregation has been experimentally obtained in Cu alloyed with 25 to 100 ppm Te. The solution-treated material fractured in a ductile intergranular mode. After aging for a short time; i.e., one day at 540C, the fracture is intergranular and is attributed to the observed integranular segregation of Te. The magnitude of the tellurium segregation and its local nature are established using Auger electron spectroscopy. Further aging results in precipitation of a stable phase throughout the grains and grain boundary fracture no longer takes place. (Author)

AD-A011 353/0GA PC$4.25/MF$2.25
George Washington Univ Washington D C Inst for the Study of Fatigue Fracture and Structural Reliability
New Aspects of Fatigue and Fracture Mechanics.
Technical rept.,
Alfred M. Freudenthal. Dec 73, 68p Rept no. TR-16
Contract N00014-67-A-0214-0011

Descriptors: *Fatigue(Mechanics), *Fracture(Mechanics), Crack propagation, Microstructure, Cracking(Fracturing), Fatigue life, Steel, Copper, Titanium, Aluminum alloys, Brass.
Identifiers: Scanning electron microscopy, Order statistics.

The significance of the results of Scanning Electron Microscope studies of the microstructural deformation and damage processes in different types of metals for the formulation of an engineering approach to the problem of fatigue and of its relation to fracture mechanics is discussed. The futility of attempts to develop a unique model of fatigue based either on physical theories of lattice defects or on mechanical theories of plastic strain accumulation is demonstrated, and the usefulness of fracture-mechanics concept applied to microcrack development and combined with probabilistic considerations based on order statistics is illustrated.

AD-A011 354/8GA PC$3.25/MF$2.25
George Washington Univ Washington D C Inst for the Study of Fatigue Fracture and Structural Reliability
The Relationship of Axial Strain Induced by Cyclic Torsion to Metal Stability and Fatigue Failure in Ti-6Al-4V.
Technical rept.,
Max Freedman, Charles M. Gilmore, and Mohammed A. Imam. Dec 73, 21p Rept no. TR-15
Contract N00014-67-A-0214-0011

Descriptors: *Titanium alloys, *Fatigue(Mechanics), Strain(Mechanics), Deformation, Dislocations.
Identifiers: Titanium alloy 6Al 4V.

The response was studied of the alloy Ti-6Al-4V to reversed cyclic torsional fatigue loading. The torsional strain amplitudes were all below the yield strain (psuedoelastic fatigue); therefore, plastic deformation is small and the conven-

tional techniques for studying fatigue in plastic metals are ineffective. A technique for studying the response of the metal that is based upon the 'Ronay effect' was applied to the study of psuedoelastic fatigue in Ti-6Al-4V. The application of the technique showed that there was a metal instability at torsional strains of approximately plus or minus 0.0055. Other related observations that indicate an instability at this strain are the occurrence of creep steps during dead loading, and it was also observed that the cycles to failure vs strain amplitude curve changes from (S) type to (H) type at this strain amplitude.

AD-A011 367/0GA PC$3.25/MF$2.25
Pennsylvania Univ Philadelphia School of Metallurgy and Materials Science
The Effect of Oxygen on the Structure and Mechanical Behavior of Aged Ti-8 WT. %Al.
Final rept. 26 Jan 71-25 Jan 72,
J. Y. Lim, C. J. McMahon, Jr., D. P. Pope, and J. C. Williams. 31 Jan 74, 22p
Contract N00019-71-C-0168
Prepared in cooperation with Rockwell International Corp., Thousand Oaks, Calif. Science Center.

Descriptors: *Titanium alloys, *Aluminum alloys, *Aging(Materials), *Oxygen, Mechanical properties, Yield strength, Fracture(Mechanics), Phase studies.
Identifiers: Titanium alloy 8Al.

It is shown that for a Ti-8 wt.%Al alloy aged at a temperature high in the two-phase region (695C) to precipitate the ordered alpha 2 phase, an increase in oxygen content from 600 ppm to 12 ppm increases the yield strength by approximately 10% and decreases the fracture strain from 20 to 1% elongation at room temperature. The fracture mode is changed from dimpled rupture to cleavage. It is demonstrated that oxygen additions alter the position of the alpha/alpha + alpha 2 coherent solvus, resulting in formation of coherent alpha 2 in specimens containing approximately or more than 1000 ppm oxygen aged at 695C. For a given aging time the volume fraction of alpha 2 increases with increasing oxygen up to 1300 wt.ppm and then levels off. The changes in mechanical behavior are attributed to the presence of alpha 2. The experimental evidence suggests that oxygen partitions preferentially into alpha 2.

AD-A011 368/8GA PC$4.25/MF$2.25
New England Inst Ridgefield Conn
Detection of Vacancy Concentration and Defects in Aluminum, Titanium and their Alloys and Nickel Base Superalloys by Positron Annihilation.
Final rept. Dec 73-Nov 74,
Shu-Jen Tao. Mar 75, 53p
Contract N00019-74-C-0170

Descriptors: *Nondestructive testing, *Grain structures(Metallurgy), *Crystal defects, Aluminum, Aluminum alloys, Titanium alloys, Nickel alloys, Superalloys, Positrons, Annihilation reactions.
Identifiers: Aluminum alloy 1100, Aluminum alloy 2024, Titanium alloy 35A, Titanium alloy 6Al 4V, Nickel alloy U-700, Nickel alloy M-200.

Positron annihilation has been used as a tool to study the effects of defects in crystalline solids in the realm of fundamental research for a long time. This paper reports an initial effort to evaluate the usefulness and the future development of positron annihilation as a tool in nondestructive evaluation, NDE. The metals studied included Al (99.99%), Al-1100, Al-2024, Ti-35A, Ti-6Al-4V, and nickel based superalloys, U-700 and M-200. The processes studied involve temperature change, work-hardening, stress-strain, creep and cyclic fatigue. The conclusion is that the process of positron annihilation is very sensitive to many kinds of defects in metals and that its potential as a tool of NDE is high. Certainly, more work is required to explore its full potential. A brief review describing the method of positron annihilation and its interaction with defects in metals is attached as an appendix.

AD-A011 379/5GA PC$4.75/MF$2.25
Battelle Columbus Labs Ohio
Oxidation and Hot Corrosion of Ni-Cr- and Co-Cr Base Alloys Containing Rare Earth Oxide Dispersions.
Final research rept. 13 Mar 74-12 May 75,
Ian G. Wright, Ben A. Wilcox, and Robert I. Jaffee. 12 May 75, 88p
Contract N62269-74-C-0291

Descriptors: *Cobalt alloys, *Corrosion, Oxidation, Dispersion hardening, Chromium alloys, Rare earth compounds, Oxides, Aluminum alloys, Yttrium oxides, Tungsten alloys, Tantalum alloys, Carbon alloys, Nickel alloys, Gas turbines.
Identifiers: Cobalt alloy 6Al 20Cr 2Y2O3.

The program was undertaken to investigate the effects of alloying elements such as tungsten, tantalum and carbon on the oxidation and hot corrosion behavior of alumina-forming, dispersion-strengthened CoCrAl alloys, with the objective of developing concepts for alloys required to operate uncoated for long periods in gas turbine engines.

AD-A011 398/5GA PC$3.25/MF$2.25
Rensselaer Polytechnic Inst Troy N Y Dept of Materials Engineering
Corrosion Fatigue of Cu and Cu 7.8% Al.
Final rept. 1 Mar-31 Aug 74,
D. J. Duquette. Dec 74, 10p ARO-12091.1-MS
Contract DAHC04-74-C-0015

Descriptors: *Corrosion, *Fatigue(Mechanics), *Copper, *Copper alloys, Stress corrosion, Aluminum alloys, Electron microscopy, Microstructure, Deformation, Cyclic tests, Surfaces, Grain boundaries.
Identifiers: Copper alloy 7.8Al, Transmission electron microscopy.

Transmission electron microscopy of pure copper exposed to air and to corrosive solutions under cyclic stresses shows that corrosion effectively 'softens' metal surfaces by destroying the dislocation cell structure and preventing its reformation, thus resulting in accelerated slip. Additionally the preferential corrosion of surface slip offsets and grain boundaries results in grooving of these areas and rapid intergranular crack initiation and similarly studies of Cu 7.8% Al alloy single crystals shows corrosion to be specifically associated with surface slip offsets.

AD-A011 502/2GA PC$4.75/MF$2.25
Defense Intelligence Agency Washington D C
Advancements in Materials Science-Foreign. Report No. 1. Reviews of Soviet Technologies,
J. Harold Marshburn. Jun 75, 87p Rept no. DST-1840S-449-75

Descriptors: *Metallurgy, *Composite materials, Welding, Adhesive bonding, Windows, Windshields, Glass, Polymers, Scientific research, Reviews, USSR.

This study is a collection of articles assessing significant Soviet achievements in materials science. It reviews Soviet efforts for relating the composition, structure, and processing of materials to their properties and uses. The topics selected for coverage include: key developments in Soviet metallurgy, fracture analysis of materials, research efforts in titanium coatings, composite materials developments, 'glue-welding' technology, and developments in optical window materials.

AD-A011 647/5GA PC$3.75/MF$2.25
Air Force Materials Lab Wright-Patterson AFB Ohio
Notch Tensile Strength of Advanced Structural Grades of Beryllium.
Technical rept. Mar-Aug 74,
T. Nicholas, and G. R. Atkins. Apr 75, 42p Rept no. AFML-TR-74-252

Descriptors: *Beryllium, Tensile strength, Notch sensitivity, Hot pressing, Isostatic pressing, Ductility, Structures.

Room temperature notch tensile strength of two advanced structural grades of beryllium was determined at quasi-static and high strain rates. Results P-1 hot isostatically pressed and S-65 hot pressed beryllium indicated that the ductility ratio of Gerard provides a more reasonable approach to design allowables for these materials than tensile elongations for tensile loading in the presence of notches. Ductility ratios of .138 for P-1 and .058 for S-65 were found to represent these materials adequately for values of the theoretical elastic stress concentration factor less than five.

AD-A011 660/8GA PC$4.25/MF$2.25
Pratt and Whitney Aircraft East Hartford Conn
Boundary-Integral Equation Method for Three-Dimensional Elastic Fracture Mechanics Analysis.
Interim scientific rept. 1 Apr 74-31 Mar 75,
T. A. Cruse. 28 May 75, 59p Rept no. PWA-5272
AFOSR-TR-75-0813
Contract F44620-74-C-0060

Descriptors: *Fracture(Mechanics), *Gas turbines, Fatigue(Mechanics), Boundary value problems, Integral equations, Crack propagation, Mathematical models, Aircraft.
Identifiers: Stress intensity factor.

Analytical and numerical modeling improvements in the three-dimensional boundary-integral equation method have been developed for fracture mechanics problems in rotating gas turbine structures for aircraft. Improved modeling procedures for accurate stress intensity factor analysis of surface and corner cracks were developed and verified. In addition the basic analytical stress analysis tool was extended to include analysis of the steady-state thermoelastic and centrifugal body force problems. Results reported include newly developed analytical formulations for crack analysis and body force problems. Extensive numerical results are reported which verify the improved analytical capabilities.

NTIS/PS-75/538/9GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Titanium and Titanium Alloy Creep (A Bibliography with Abstracts).
Rept. for 1964-Jul 75,
Mona F. Smith. Jul 75, 114p*

Descriptors: *Bibliographies, *Titanium, *Titanium alloys, *Creep, Abstracts, Stress corrosion, Fractures(Materials), Crack propagation, Microstructure, Tests, Aluminum containing alloys, Vanadium containing alloys, Molybdenum containing alloys, Fatigue(Materials), Aircraft, Spacecraft, Nuclear reactor materials, Mechanical properties.

Research is cited on creep of titanium and its alloys with regard to composition, stress corrosion, fracture, microstructure and tests. Many reports deal with titanium alloys to be used for aircraft, spacecraft, and nuclear reactor applications. (Contains 109 abstracts).

NTIS/PS-75/555/3GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Corrosion in Boilers (A Bibliography with Abstracts).
Rept. for 1964-Jul 75,
Mona F. Smith. Jul 75, 82p*

Descriptors: *Bibliographies, *Corrosion, *Boilers, *Electric power plants, Air pollution, Corrosion inhibitors, Design, Combustion, Magnetohydrodynamics, Ships, Nuclear reactors, Coal, Fuel oil, Natural gas, Tests, Stress corrosion, Abstracts.
Identifiers: Air pollution control.

Contains abstracts on research for design, improved efficiency, materials, cathodic protection, corrosion inhibiting additives and combustion in coal and fuel oil fired boilers. In addition, documents are cited on corrosion from limestone injection for pollution control, magnetohydrodynamics, ship boilers, and nuclear power plant boilers. (Contains 77 abstracts)

N75-22426/1GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Relation of Structure to Mechanical Properties of Thin Thoria Dispersion Strengthened Nickel-Chromium (Td-Nicr Alloy Sheet.
J. D. Whittenberger. May 75, 29p NASA-TN-D-7988, E-8251

Descriptors: *Chromium alloys, *Creep strength, *Mechanical properties, *Microstructure, *Nickel alloys, Precipitation hardening, Stress-strain diagrams, Tensile tests.

For abstract, see STAR 1314

N75-22427/9GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Compositional Effects on Mechanical Properties of Hafnium-Carbide-Strengthened Molybdenum Alloys.
W. R. Witzke. May 75, 34p NASA-TM-X-3239, E-8221

Descriptors: *Hafnium carbides, *High strength alloys, *Mechanical properties, *Stoichiometry, Chemical composition, Creep strength, Ductility, Molybdenum, Tensile properties.

For abstract, see STAR 1314

N75-22428/7GA PC$3.75/MF$2.25
Pisa Univ. (Italy).
Experimental Research for Characterizing Nickel-Steel by Low Temperature Investigations with the Criteria of Fracture Mechanics Ricerca Sperimentale Per la Caratterizzazione di UN Acciaio al Nichel Per Impieghi a Bassa Temperatura Con Criteri Della Meccanica Della Frattura.
C. Carmignani, P. Cibecchini, and S. Reale.
1974, 28p REPT-37
Language in Italian.

Descriptors: *Fracture mechanics, *Low temperature, *Steels, Cylinders, Nickel alloys, Pressure vessels, Strain gages.

For abstract, see STAR 1314

N75-22429/5GA PC$3.75/MF$2.25
Pisa Univ. (Italy).
On the Fatigue Behavior of Structural Elements of Austenitic Stainless Steel at High Temperature Sul Comportamento a Fatica AD Alta Temperatura di Elementi Strutturali In Acciaio Inossidabile di Tipo Austenitico.
A. Delpuglia. 1974, 37p REPT-50
Subm-Sponsored by Cnr.
Language in Italian.

Descriptors: *Austenitic stainless steels, *Fatigue life, *High temperature, Creep properties, Fatigue tests, Performance prediction, Research management.

For abstract, see STAR 1314

N75-22435/2GA PC$3.75/MF$2.25
Oxford Univ. (England). Dept. of Engineering Science.
Strain Rate Effects in 1.5 Per Cent Crmo Steel.
Final Report.
A. I. O. Zaid, and J. Harding. Sep 74, 49p OUEL-1104/74
Contract AT/2057/050/MAT-R

Descriptors: *High strength steels, *Strain rate, *Stress-strain diagrams, *Torsional stress, Chromium steels, Molybdenum alloys, Quenching (Cooling), Temper (Metallurgy), Yield strength.

For abstract, see STAR 1314

N75-22436/0GA PC$3.75/MF$2.25
Oxford Univ. (England). Dept. of Engineering Science.
The Temperature and Strain Rate Sensitivity of alpha-Titanium.
J. Harding. Oct 74, 34p OUEL-1108/74
Subm-Sponsored in Part by Sci. Res. Council. Conf-Presented at the Euromech 53 Colloq. On Thermoplasticity, Jablonna, Poland, 16-19 Sep. 1974.

Descriptors: *Strain rate, *Stress-strain diagrams, *Temperature effects, *Titanium, Activation energy, Annealing, Close packed lattices, Enthalpy, Impact tests, Plastic flow, Stress analysis, Tensile tests.

For abstract, see STAR 1314

N75-22437/8GA PC$3.75/MF$2.25
European Space Research Organization, Paris (France).
Investigation of the Stress-Corrosion Susceptibility of the Steel X 3 Crnim-on 17 13 5, M. No. 1,4439 with the Constant Straining Method in CACL2 and Nacl.
H. Buhl. Feb 75, 38p ESRO-TT-137, DLR-FB-74-48
Tran-Transl. Into English of "Untersuch. Der Spannungskorrosionsempfindlichkeit des Stahles X 3 Crnimon 17 13 5, W.Nr. 1.4439, MIT Konstanter Dehnungsgeschwindigkeit in CACL2 U. Nacl", Dfvlr, Porz, West Ger. Report Dlr-FB-74-48, 1 Jul. 1974. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 17 Dm.

Descriptors: *Austenitic stainless steels, *Strain rate, *Stress corrosion, Calcium chlorides, Electric potential, Electrodes, Sodium chlorides, Tensile strength.

For abstract, see STAR 1314

N75-22784/3GA PC$3.75/MF$2.25
Rocketdyne, Canoga Park, Calif.
Fracture Mechanics Analysis of a High-Pressure Hydrogen Facility Compressor.
Final Report.
G. A. Vroman. 11 Oct 74, 34p NASA-CR-120742, RSS-8597
Contract NAS8-27980

Descriptors: *Compressors, *Fracture mechanics, *High pressure, *Hydrogen embrittlement, Crack propagation, Fracture strength, Graphs (Charts), Life (Durability), Tables (Data), Tensile strength.

For abstract, see STAR 1314

PB-242 495/0GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
Index to BSC Strip Mills Division Research Department's Reports, Technical Notes, Monographs and Bibliographies Published 1970-1974,
D. R. Lloyd-Owen. Apr 75, 25p BISRA-SM/BIB/867

Descriptors: *Steel making, *Bibliographies, Indexes(Documentation), Books, Technical reports, Great Britain.

Full abstracts are given to sixty seven documents, and subject and author indexes are provided.

PB-242 497/6GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
Induced Electromagnetic Stirring in Electroslag Remelting,
D. I. Dawson, and A. Siswick. Apr 75, 18p BISRA-CDL/ESD/6/74

Descriptors: *Electrorefining, Stirring, Slags, Steels, Electromagnetic fields, Great Britain.

The feasibility of inducing circulatory stirring in the slag bath during the electroslag remelting of ingots of up to 310 mm diameter has been investigated. Observations have been made of the motor effects produced by external stirring coils in respect of ingot structure, surface finish, melt-stability, efficiency and rate.

PB-242 498/4GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
Metallography of Foaming Slags,
E. Johnson. Apr 75, 14p BISRA-GS/PROD/9/18/74/C

Descriptors: *Slags, Foaming, Metallography, Electron microscopy, Great Britain.

Samples of foaming and non-foaming slags have been examined by optical and scanning electron microscopy as part of a program of work being carried out by the S.S. and E.M. Group Metallurgical Department to investigate the phenomena of foaming. Small carbon rich metallic globules could be found entrapped in the foaming slag samples but nothing could be seen on the pore surface to account for the foam stability. The optical and chemical assessments of the slag have, however, confirmed several observations made in work published by other investigators.

PB-242 500/7GA PC$3.75/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
A Laboratory Investigation of the Processing Behaviour and Properties of Niobium Bearing E.D.D. Steels,
R. J. Hazel, and R. C. Hudd. Apr 75, 28p BISRA-SM/734/A

Descriptors: *Low alloy steels, Niobium containing alloys, Deep drawing, Heat treatment, Metal rolling, Mechanical properties, Metallographic structures, Great Britain.

A laboratory investigation of the processing behavior and properties that may be obtained in cold rolled and annealed, very low carbon steel containing niobium has been carried out. The work has confirmed that EDD steels with drawing properties superior to those of existing aluminium stabilized steel may be obtained. A wide variation in properties was, however, produced due to the extreme difficulties in controlling laboratory hot rolling. Best properties were produced when a fine precipitate distribution was present in the hot band and when there

was a pronounced hot band texture. As with titanium bearing steels, the niobium bearing steels recrystallize during annealing at higher temperatures than aluminum stabilized steel. On the basis of the results obtained, a successful works trial was carried out, the results of which will be given in a separate report.

PB-242 504/9GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
A Tentative Method for the Determination of Zirconium in Steel,
H. J. Boniface, C. Aitchison, and R. O'Leary.
Mar 75, 6p BISRA-SM/TN/A/380

Descriptors: *Carbon steels, *Colorimetric analysis, Photometry, Zirconium, Great Britain.

A method is presented for the determination of zirconium in plain carbon steels in the range 0.0005% to 0.20% Zr. It is based on the work of Staats et al and Shizuya Mackawa et al and employs cupferron separation and photometric determination of the Zr-catechol violet complex. Results obtained when the method was applied to a standard steel indicate good precision.

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A011 441/3GA PC$3.25/MF$2.25
Naval Air Propulsion Test Center Trenton N J
Evaluation of MIL-L-23699 Lubricant Performance in the TF41-A-2 Engine.
Final rept.,
Frank Feinberg. May 75, 22p Rept no. NAPTC-PE-59

Descriptors: *Attack bombers, *Turbofan engines, *Lubrication, Lubricants, Lubricating oils, Viscosity, Oil consumption, Oxidation, Corrosion.
Identifiers: F-41 engines, TF-41A2 engines, A-7 aircraft, A-7E aircraft.

An evaluation was made of the service performance characteristics of MIL-L-23699B oils in TF41-A-2 engines. Operational experience and problems as well as the condition of the lubricant wetted engine components at overhaul are discussed. Recommendations are made concerning the expected life of MIL-L-23699B oils in the TF41-A-2 engine.

AD-A011 656/6GA PC$4.25/MF$2.25
Pratt and Whitney Aircraft East Hartford Conn
Influence of Turbine Engine Lubricant Load Carrying Ability on Gear System Design.
Final rept. 4 Mar-15 Aug 74,
F. C. Hsing, and W. J. Walker. Sep 74, 56p Rept no. PWA-5090 AFAPL-TR-74-94
Contract F33615-74-C-2021

Descriptors: *Jet engines, *Gearboxes, *Lubricants, Gear teeth, Lubrication, Weight reduction, Life cycles, Life cycle testing.
Identifiers: JT-9 engines, JT-9D7 engines, TF-30 engines, TF-30-P-100 engines, T-34 engines, H-53 aircraft, CH-53 aircraft, *Scuffing limit.

The objective of this study was to evaluate the effect of lubricant load-carrying ability on the design of gear systems in aircraft turbine engine accessory and main power transmission gearboxes. Five gearbox designs, representing a wide range of applications and power levels, were analyzed to assess any payoff, in terms of weight reduction and life cycle operating cost, which may be possible through the use of lubricants possessing increased load-carrying ability. The designs included a modern transport engine, JT9D-7, accessory gearbox; a current fighter engine, TF30-P-100, accessory gearbox; a turboprop, T34, main power transmission gearbox; a proposed turbofan, QCSEE, main power transmission gearbox reflecting advanced technology and a helicopter, CH53, gearbox.

N75-22765/2GA PC$3.75/MF$2.25
Marconi Space and Defence Systems Ltd., Camberley (England). Space and Instrumentation Div.
Lubrication by Lead Films. A Survey of Existing and Proposed Applications.
P. J. Donnell. 1975, 37p
Subm-Sponsored in Part by Min. Of Defence and Esro. Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Lead (Metal), *Mechanical drives, *Metal films, *Solid lubricants, *Spacecraft lubrication, Actuators, Reaction wheels, Satellite antennas, Solar arrays, Spin reduction.

For abstract, see STAR 1314

N75-22766/0GA PC$3.75/MF$2.25
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Lead Film Lubrication in Air and Vacuum.
M. J. Todd. 1975, 33p
Contract ESTEC-1610/72-SK
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Ball bearings, *Failure analysis, *Lead (Metal), *Metal films, Air, Sliding friction, Solid lubricants, Torque, Ultrahigh vacuum, Wear.

For abstract, see STAR 1314

N75-22767/8GA PC$3.25/MF$2.25
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Performance of Dry Lubricated Slip Rings for Satellite Applications.
A. J. Walton, H. E. Hintermann, and M. Mailatt. 1975, 23p
Contract ESTEC-1560/72-SK
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Electric contacts, *Performance tests, *Ring structures, *Solid lubricants, *Spacecraft environments, Brushes, Mechanical drives, Molybdenum disulfides, Noise intensity, Silver, Sliding friction, Wear.

For abstract, see STAR 1314

N75-22768/6GA PC$3.25/MF$2.25
British Aircraft Corp., Stevenage (England).
A Post-Test Study of Grease Lubricated Satellite de-Spin Mechanism Bearings.
B. H. Baxter. 1975, 24p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Bearings, *Greases, *Satellite antennas, *Spin reduction, Acids, Chromatography, Lubricants, Residues, Space environment simulation.

For abstract, see STAR 1314

N75-23263/7GA Not available NTIS
Bhabha Atomic Research Centre, Bombay (India).
Lubricants in Nuclear Technology: A Brief Review.
S. B. Srivastava, and V. B. Thomas. 1974, 19p BABC-751

Descriptors: *Lubricants, *Nuclear research, *Technology transfer, Research and development, Technology utilization.

For abstract, see STAR 1314

11I. Plastics

NTIS/PS-75/554/6GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Polycarboranes (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Kirk G. Werner. Jul 75, 77p*
Supersedes NTIS/PS-74/117.

Descriptors: *Bibliographies, Siloxanes, Heat resistant plastics, Copolymers, Synthesis(Chemistry), Abstracts, Polymerization, Carboranes, Thermal stability, Silicone resins, Elastomers, Crosslinking, Mechanical properties, Molecular properties.
Identifiers: Dexsil polymers, *Polycarboranes, Radiation polymerization.

This bibliography covers the synthesis, polymerization, and the physical and molecular properties of carborane polymers and copolymers. Dexsil polymers and heat resistant properties are also covered. (Contains 72 abstracts).

NTIS/PS-75/560/3GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Heat Resistant Plastics. Part 1. Nitrogen Containing Polymers (A Bibliography with Abstracts).
Rept. for 1964-Jul 75,
Edward J. Lehmann. Jul 75, 162p*
See also Part 2, NTIS/PS-75/561.

Descriptors: *Bibliographies, *Heat resistant plastics, *Polyamide resins, *Polyimide resins, Polymerization, Synthesis(Chemistry), Nitrogen heterocyclic compounds, Elastomers, Benzimidazoles, Thermal stability, Decomposition reactions, Polymeric films, Mechanical properties, Abstracts.
Identifiers: Ladder polymers, *Polyquinoxalines, Polybenzoxazoles, *Polybenzimidazoles, Nomex polymers, BBB polymers, BBL polymers.

The synthesis, applications, testing, decomposition, and properties of heat resistant nitrogen containing polymers are covered in this bibliography of Federally-sponsored research. The major polymers discussed are polyquinoxalines and polybenzimidazoles. (Contains 157 abstracts).

NTIS/PS-75/561/1GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Heat Resistant Plastics. Part 2. Silicone, Carborane, Halocarbon, and Other Polymers (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Edward J. Lehmann. Jul 75, 175p*
See also Part 1, NTIS/PS-75/560.

Descriptors: *Bibliographies, *Heat resistant plastics, *Halocarbon resins, *Silicone resins, Polycyclic compounds, Polymerization, Thermal stability, Mechanical properties, Synthesis(Chemistry), Elastomers, Decomposition reactions, Carboranes, Phenolic resins, Halohydrocarbons, Fluorohydrocarbons, Abstracts.
Identifiers: *Polycarboranes, Dexsil polymers, *Polyferrocines, Ladder polymers, *Fluorinated polymers.

Research on heat resistant plastics and elastomers excluding nitrogen containing polymers are presented in this bibliography of

Federally-funded research. The synthesis, chemical properties, physical and mechanical properties, applications, and fabrication of such polymers are covered. The major resins studied include polysilicones, polycarboranes, phosphorus containing polymers, and halocarbon polymers. (Contains 170 abstracts).

N75-22456/8GA PC$3.25/MF$2.25
Explosives Research and Development Establishment, Waltham Abbey (England).
The Strength of Thermoplastic Materials. Part 1: Critical Stress Cracking in Uniaxial Tension of Polymers with Phenylene Groups in the Main Chain.
B. J. Macnulty. Oct 73, 22p ERDE-TR-145, BR43696

Descriptors: *Critical loading, *Fracture strength, *Liquid-solid interfaces, *Polymeric films, *Thermoplastic resins, Crack initiation, Polyphenyls, Solubility, Stress concentration, Surface cracks, Temperature effects, Tensile tests.

For abstract, see STAR 1314

11L. Wood and Paper Products

PB-242 390/3GA PC$3.25/MF$2.25
Western Forest Products Lab., Vancouver (British Columbia).
Tests of Laminated Beams from E-Rated Western Spruce and Lodge-Pole Pine.
Information rept.,
T. W. Littleford. Sep 74, 22p VP-X-132

Descriptors: *Laminated wood, *Beams(Supports), *Test methods, Modulus of elasticity, Flexural strength, Pine wood, Spruce wood, Stresses, Canada.

Modulus of elasticity and modulus of rupture were determined for 24 beams laminated from various combinations of E-rated western spruce and lodgepole pine lumber. The results showed that the moduli of elasticity assigned by the American Institute of Timber Construction to beams of several species groups in the U.S. are applicable, also, to mixed spruce-pine beams in Canada, if the same combinations of E-rated lumber are used. Whether the allowable bending stresses of the AITC are equally applicable to such spruce-pine beams will depend upon the end joints in laminations. The strength of the end joints in the tested beams would appear to limit the allowable stress to 2200 psi, regardless of the combination of E-rated lumber used. Since this value is approximately 30% larger than the allowable value for beams made from visually graded spruce and pine and within 10% of the value for Douglas-fir beams, there is clearly a potential use for machine-graded spruce-pine in the Canadian laminating industry.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD/A-011 526/1GA PC$4.25/MF$2.25
California Univ., San Diego, La Jolla. Dept. of Mathematics.
Monotonicity of Certain Functionals under Rearrangement,
A. M. Garsia, and E. Rodemich. 1974, 52p AFOSR-TR-75-0695
Grant AF-AFOSR-2088-71
Availability: Pub. in Extrait des Annales de l'Institut Fourier de l'Universite de Grenoble, v24 n2 p67-116 1974.

Descriptors: *Functional analysis, Inequalities, Convex sets, Fourier series, Theorems, Reprints.

AD-A011 155/9GA PC$3.25/MF$2.25
Scripps Institution of Oceanography San Diego Calif Marine Physical Lab
Maximum-Entropy Spatial Processing of Array Data.
Summary rept.,
R. N. McDonough. 21 Jan 74, 13p Rept no. MPL-U-85/73
Contract N00014-69-A-0200-6002
Availability: Pub. in Geophysics, v39 n6 p843-851 Dec 74.

Descriptors: *Spectrum analysis, *Signal processing, Linear arrays, Power spectra, Spatial distribution, Bearing(Direction), Bottom, Oceans, Time series analysis, Entropy, Algorithms, White noise, Marine geophysics, Reprints.
Identifiers: MESA(Maximum entropy spectral analysis), Maximum entropy spectral analysis.

The procedure of maximum -entropy spectral analysis (MESA), used in the processing of time series data, also applies to wavenumber (bearing) analysis of signals received from a spatially distributed linear array of sensors. The method is precisely the use of autoregressive spectral analysis in the space dimension rather than in time. There are also close links to the predictive deconvolution method used in geophysical work, and to the process of constructing noise-whitening filters in communication theory, as well as to least-squares model building. In this note, the maximum-entropy procedure is reviewed and all these links are pointed out. The specific algorithm appropriate to a uniformly spaced line array of sensors is given as well as one possible algorithm for use in the case of nonuniform sensor spacing.

AD-A011 164/1GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Two-Dimensional Digital Filtering,
Russell M. Mersereau, and Dan E. Dudgeon. 14 Aug 74, 15p
Contract N00014-67-A-0204-0064, Grant NSF-GK-31353
Availability: Pub. in IEEE Proceedings, v63 n4 p610-623 Apr 75.

Descriptors: *Digital filters, *Signal processing, Two dimensional, Linear programming, Integer programming, Geophones, Arrays, Recursive filters, Reprints.

The problems of designing and implementing LSI systems for the processing of 2-D digital data, such as images or geophone arrays, are reviewed and discussed. This discussion encompasses both FIR and IIR digital filters and with respect to the latter, the issues of stability testing and filter stabilization are also considered. Techniques are also presented whereby such filtering can be accomplished using either 1 or 2-D LSI systems. (Author)

AD-A011 165/8GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Two-Dimensional Recursive Filter Design Using Differential Correction,
Dan E. Dudgeon. 2 Feb 74, 5p
Contract N00014-67-A-0204-0064
Availability: Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, vASSP-23 n3 p264-267 Jun 75.

Descriptors: *Recursive filters, *Signal processing, Algorithms, Two dimensional, Linear programming, Digital filters, Subroutines, Reprints.

This paper is based upon a presentation given at the 1974 Arden House Digital Signal Processing Workshop. The presentation discussed a method for designing two-dimensional recursive digital filters using a differential correction algorithm. A brief description of the algorithm and some design examples will be presented here. This design approach is compared to a similar approach used by Bednar and Farmer. (Author)

AD-A011 194/8GA PC$3.25/MF$2.25
Maryland Univ College Park
Legendre Functions with Both Parameters Large,
F. W. J. Olver. 8 May 74, 13p ARO-7319.17-M
Grant DA-ARO-D-31-124-72-G49
Availability: Pub. in Philosophical Transactions of the Royal Society of London. A. Mathematical and Physical Sciences, v278 n1279 p175-185 1975.

Descriptors: *Linear differential equations, Legendre functions, Domains, Transformations(Mathematics), Approximation(Mathematics), Great Britain, Reprints.

By application of the theory for second-order linear differential equations with two turning points developed in the preceding paper, some new asymptotic approximations are obtained for the associated Legendre functions when both the degree n and order m are large.

AD-A011 196/3GA PC$3.75/MF$2.25
Maryland Univ College Park
Second-Order Linear Differential Equations with Two Turning Points,
F. W. J. Olver. 8 May 74, 42p ARO-7319.16-M
Grant DA-ARO-D-31-124-72-G49
Availability: Pub. in Philosophical Transactions of the Royal Society of London. A. Mathematical and Physical Sciences, v278 n1279 p137-174 1975.

Descriptors: *Linear differential equations, Approximation(Mathematics), Asymptotic series, Functions(Mathematics), Transformations(Mathematics), Great Britain, Reprints.
Identifiers: Parabolic cylinder functions.

It was shown how to transform linear second-order differential equations having two simple turning points, or one double turning point, into forms closely resembling differential equations satisfied by the parabolic cylinder functions. It was also proved that the coefficients in the transformed equations are continuous functions of both the independent variable and a parameter governing the distance separating the turning points. Relevant properties of the parabolic cylinder functions were assembled, and certain auxiliary functions introduced to facilitate estimation of the parabolic cylinder functions throughout oscillatory and exponential regions. Then approximate solutions of the transformed differential equations were constructed in terms of the parabolic cylinder functions. Also considered was the problem of extending the asymptotic solutions to negative values of the independent variable in cases where the direct results apply only to positive values.

AD-A011 207/8GA PC$3.25/MF$2.25
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Singular Perturbations of a Class of Time-Optimal Controls,
P. V. Kokotovic, and A. H. Haddad. 1 May 74, 3p AFOSR-TR-75-0637
Contract DAAB07-72-C-0259, Grant AF-AFOSR-2570-73
Availability: Pub. in IEEE Transactions on Automatic Control, Technical Notes and Correspondence, p163-164 Feb 75.

Descriptors: *Time domain, *Control, *Mathematical models, Linear systems, Time, Perturbations, Integrators, Reprints.

An approximate time-optical control of a linear time invariant system consisting of a cascade of fast and slow subsystems is proposed. (Author)

AD-A011 273/0GA PC$3.25/MF$2.25
North Carolina Univ Chapel Hill Dept of Statistics
Extreme Sample Censoring Problems with Multivariate Data - I.
Technical rept.,
N. L. Johnson. Jun 75, 11p Rept no. Mimeo Ser-1010 ARO-11959.3-M
Contract DAHC04-74-C-0030

Descriptors: *Multivariate analysis, *Sampling, Random variables, Normal density functions.
Identifiers: Order statistics.

This paper contains a discussion of ways in which problems of the kind described in previous papers may arise in connection with multivariate data. Censoring of univariate data can be 'generalized' in many different ways, and there is a corresponding variety of problems connected with the detection of such censoring. In this paper, the author describes some classes of problems and indicates methods for their solution. Later reports will contain details for specific problems, and relevant numerical tables.

AD-A011 302/7GA PC$3.25/MF$2.25
Watervliet Arsenal N Y Benet Weapons Lab
A New Equation of State for Solids.
Technical rept.,
Y. K. Huang. 1974, 9p Rept no. WVT-TR-75021
Availability: Pub. in Jnl. of the Franklin Inst., v299 n1 p67-71 Jan 75.

Descriptors: *Equations of state, *Solids, Hydrostatics, High pressure, Compression, Shock waves, Reprints.

AD-A011 329/0GA PC$3.25/MF$2.25
Polytechnic Inst of New York Brooklyn Dept of Electrical Engineering and Electrophysics
Ambiguity Function in Fourier Optics,
Athanasios Papoulis. 6 Jul 73, 13p AFOSR-TR-75-0731
Contract F44620-69-C-0047
Availability: Pub. in Jnl. of the Optical Society of America, v64 n6 p779-788 Jun 74.

Descriptors: *Diffraction, *Fourier transformation, Coherent scattering, Light scattering, Transformations(Mathematics), Reprints.
Identifiers: Ambiguity functions, Fourier optics.

A theory of Fresnel diffraction and Fourier optics results is presented, involving merely coordinate transformations of the independent variables of the aperture ambiguity function. As an application, a simple expression for the width of the diffracted beam is derived in terms of certain moments of the amplitude of the incident wave. The analysis is extended to signals crossing a layer of a random medium. At the exit plane, the field is partially coherent and it spreads as it propagates. The broadening of beam width due to the loss in coherence is related to the statistical properties of the layer.

AD-A011 330/8GA PC$3.25/MF$2.25
Polytechnic Inst of New York Brooklyn Dept of Electrical Engineering and Electrophysics
Estimation of the Average Density of a Nonuniform Poisson Process,
Athanasios Papoulis. 27 Apr 73, 7p AFOSR-TR-75-0732
Contract F44620-69-C-0047
Availability: Pub. in IEEE Transactions on Communications, vCOM-22 n2 p162-167 Feb 74.

Descriptors: *Poisson density functions, Two dimensional, Nonuniform, Parabolas, Density, Information theory, Reprints.

AD-A011 365/4GA PC$3.25/MF$2.25
Harvard Univ Cambridge Mass Dept of Statistics
Final Report on Contract No. N00014-67-A-0298-0017, NR-042-097.
Final rept. 1957-1975,
William G. Cochran. Jun 75, 16p
Contract N00014-67-A-0298-0017

Descriptors: *Statistical analysis, Normal density functions, Estimates, Hypotheses, Analysis of variance, Sampling, Experimental design, Stochastic processes.

The research areas under this contract have been frequency distributions, estimation, hypothesis testing, relationships, variance analysis, sampling designs, design of experiments, and stochastic processes.

AD-A011 430/6GA PC$3.75/MF$2.25
Naval Underwater Systems Center Newport R I
Error Statistics for Normal Random Variables.
Technical rept.,
Donald R. Childs, Denis M. Coffey, and Stephen P. Travis. 7 May 75, 27p Rept no. NUSC-TR-4724

Descriptors: *Statistical analysis, *Normal density functions, *Random variables, Circular error probable, Matrices(Mathematics), Computations.
Identifiers: Root mean square error, Mean radial error, Geometric mean error.

Four commonly used error statistics (the root mean square error, the geometric mean error, the mean radial error, and the spherical (or circular) error probable) are surveyed and compared in two and three dimensions. Exact or approximate closed-form expressions are given for these statistics for zero-mean, independent, normal random variables. A change of variables reduces the case of correlated variables to the independent case. The expression for the mean radial error in three dimensions and the approximations of the spherical error probable are new. The dependence of the statistics on the variances of the errors is presented graphically.

AD-A011 445/4GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Computer Science
On Complete Subgraphs of r-Chromatic Graphs,
B. Bollabas, P. Erdos, and E. Szemeredi. Apr 75, 19p Rept no. STAN-CS-75-488
Contract N00014-67-A-0112-0057, Grant NSF-GJ-36473
Prepared in cooperation with Cambridge Univ. (England) and Magyar Tudomanyos Akademia, Budapest.

Descriptors: *Graphs, Set theory, Colors, Theorems.
Identifiers: *Graph theory.

AD-A011 477/7GA PC$3.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Linear System Realization Based on Data Set Representations.
Journal reprint,
D. R. Audley, S. L. Baumgartner, and W. J. Rugh. 14 May 74, 2p Rept no. ARL-75-0216
Availability: Pub. in IEEE Transactions on Automatic Control, p432-433 Jun 75.

Descriptors: *Linear systems, *Markov processes, Transfer functions, Parameters, Polynomials, Matrices(Mathematics), Reprints.
Identifiers: Data sets.

The problems of partial and complete linear system realization are considered using a general class of system representations. Direct identification schemes based on different types of input-output experiments are known for many representations in the class. (Author)

AD-A011 486/8GA PC$5.75/MF$2.25
Texas Tech Univ Lubbock Dept of Electrical Engineering
Resolution Space, Networks and Non-Self-Adjoint Spectral Theory.
Interim rept.,
R. Saeks, R. DeCarlo, and M. Strauss. Mar 75, 132p AFOSR-TR-75-0797
Grant AF-AFOSR-2631-74
See also report dated Feb 75, AD-A008 643.

Descriptors: *Control theory, Nonlinear systems, Stochastic processes, Differential equations, Theorems.
Identifiers: Spectral theory, Stochastic control.

Contents:
On the encirclement condition and its generalization;
Reproducing Kernel Resolution Space and its applications;
The factorization problem - a survey;
A kernels theorem for a class of nonlinear operators;
Tutorial discussion of WAS;
A perturbation theorem for a class of differential operators;
A stochastic control problem.

AD-A011 525/3GA PC$3.25/MF$2.25
California Univ San Diego La Jolla Dept of Mathematics
The Burgess Davis Inequalities via Fefferman's Inequality,
Adriano M. Garsia. 8 Aug 72, 12p AFOSR-TR-75-0694
Grant AF-AFOSR-2088-71
Availability: Pub. in Arkiv for Matematik, v2 n2 p229-237 1973.

Descriptors: *Inequalities, Vector spaces, Probability density functions, Random variables, Reprints.
Identifiers: Burgess Davis inequalities, Fefferman's inequalities.

AD-A011 527/9GA PC$3.25/MF$2.25
California Univ San Diego La Jolla Dept of Mathematics
On a Convex Function Inequality for Martingales,
Adriano M. Garsia. 28 Feb 72, 5p AFOSR-TR-75-0696
Grant AF-AFOSR-2088-71
Availability: Pub. in Annals of Probability, v1 n1 p171-174 1973.

Descriptors: *Inequalities, Probability, Vector spaces, Convex sets, Random variables, Reprints.
Identifiers: Martingale inequalities.

AD-A011 528/7GA PC$3.25/MF$2.25
Brown Univ Providence R I Div of Applied Mathematics
Application of Abstract Variational Theory to Hereditary Systems, a Survey,
H. T. Banks, and Andrzej Manitius. 1 Jun 74, 12p AFOSR-TR-75-0853
Grant AF-AFOSR-2078-71
Availability: Pub. in IEEE Transactions on Automatic Control, vAC-19 n5 p524-533 Oct 74.

Descriptors: *Control theory, *Feedback, *Control systems, Calculus of variations, Automatic, Control, Optimization, Lagrangian functions, Banach space, Differential equations, Difference equations, Volterra equations, Bioengineering, Reprints.
Identifiers: *Variational principles, *Maximum principles, *Hereditary systems.

In this survey paper, results for optimal control problems governed by hereditary systems are presented and discussed. Although fundamental results (controllability, existence and uniqueness of optimal controls, feedback controls) obtained without employing abstract variational approaches are briefly reviewed, emphasis is placed on those results established through the use of general abstract variational theories, and, in particular, on those growing out of the theories developed by the late L. W. Neustadt. Motivating examples of hereditary systems encountered in applications (technological, biological, and biomedical) are given. Abstract variational theories involving the Lagrange Multiplier rule and the Kuhn-Tucker conditions in a Banach space, the approach of Dubovitskii-Milyutin, the quasiconvexity ideas of Gamkrelidze, and the abstract maximum principles developed in the work of Halkin and Neustadt are summarized briefly. A more detailed discussion of applications of the quasiconvexity ideas and the Neustadt theory to systems governed by differential-difference, functional-differential, and Volterra integral equations is presented for control problems both with and without constraints. Recent results for control of hereditary systems with terminal function space boundary conditions are also reviewed. (Author)

AD-A011 583/2GA PC$4.75/MF$2.25
George Washington Univ Washington D C Graduate School of Arts and Sciences
Methods of Fitting Learning Curves to Lot Data Based on Assumptions and Techniques of Regression Analysis.
Master's thesis,
Robert Blair Ilderton. Aug 70, 89p

Descriptors: *Learning curves, *Regression analysis, Curve fitting, Least squares method, Computer programming, Cost estimates, Computations, Theses.
Identifiers: ICLOT computer program, CALOT computer program.

This thesis is primarily concerned with the formulae and mathematical procedures incorporated in the ICLOT and CALOT programs which were developed in 1967 to fit learning curves to historical lot data under the unit curve and cumulative average curve theories, respectively. The same formulae and procedures were also incorporated in the ICUNI and CAUNI programs, which were developed at the same time to fit learning curves to unit data. These programs have been used to support DCAA recommendations on cost estimates submitted by hundreds of defense contractors. This usage, plus the availability of these programs in the general libraries of services which account for most of the time-shared computer usage in the United States, has led to their adoption by many defense contractors and other time-shared computer customers.

AD-A011 592/3GA PC$4.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
A Direct Approach to the Theory of the Degree of a Mapping.
Final rept. 1 Aug 72-1 Aug 74,
Kenneth O. Leland. Mar 75, 73p Rept no. ARL-75-0027

Descriptors: *Algebraic topology, *Mapping(Transformations), Analytic functions, Convex sets, Vector spaces, Theorems.
Identifiers: *Homology and cohomology theory.

This expository paper revives an approach to the theory of the degree of a mapping from Euclidean n-space into Euclidean n-space of value to analysts and applied mathematicians that has been obscured by the explosive growth of recent years. This approach can be called that of singular homology, a field which has been eclipsed by the rise of simplicial homology and its many generalizations.

AD-A011 593/1GA PC$3.75/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
On Covariance Structures.
Technical interim rept.,
P. R. Krishnaiah, and Jack Chao-Shing Lee. Apr 75, 30p Rept no. ARL-75-0103

Descriptors: *Multivariate analysis, *Normal density functions, Matrices(Mathematics), Hypotheses, Statistical tests, Theorems.
Identifiers: Covariance matrices.

In this report, the authors consider the problem of testing the hypothesis that the covariance matrix of the multivariate normal distribution has certain structure. Under certain conditions, the problem is basically reduced to the problem of testing for the multiple independence of several sets of variables and the equality of the covariance matrices within several batches of populations.

AD-A011 594/9GA PC$3.75/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Classification and Estimation of Growth Curves, a Bayesian Approach,
Jack Chao, and Seng Lee. Mar 75, 28p Rept no. ARL-75-0025

Descriptors: *Multivariate analysis, *Bayes theorem, Matrices(Mathematics), Estimates, Distribution functions.
Identifiers: Parameter estimation, Covariance matrices, Growth curves.

Classification of observations and estimation of parameters in growth curves are considered from a Bayesian viewpoint. The author considers two different covariance matrices, (1) Sigma arbitrary positive definite and (2) Sigma = X(Gamma)(X prime) + Z theta(Z prime), which was first considered by Rao, where X is p x m of rank m < p and Z is p x p - m such that (X prime)Z = 0.

AD-A011 626/9GA PC$3.25/MF$2.25
Michigan State Univ East Lansing Dept of Mathematics
Existence Questions for the Problem of Chebyshev Approximation by Interpolating Rationals,
G. D. Taylor, and J. Williams. 13 Feb 73, 8p AFOSR-TR-75-0699
Grant AF-AFOSR-2271-72
Availability: Pub. in Mathematics of Computation, v28 n128 p1097-1103 Oct 74.

Descriptors: *Chebyshev polynomials, *Approximation(Mathematics), *Rational functions, Interpolation, Numerical analysis, Reprints.
Identifiers: *Constraints.

This paper considers a problem of Chebyshev approximation by interpolating rationals. Examples are given which show that best approximations may not exist. Sufficient conditions for existence are established, some of which can easily be checked in practice. Illustrative examples are also presented. (Author)

AD-A011 633/5GA PC$3.75/MF$2.25
Indiana Univ Bloomington Dept of Mathematics
Generalized Hypercomthex Function Theory,
Robert P. Gilbert, and Gerald Hile. 22 Dec 72, 32p AFOSR-TR-75-0701
Grant AF-AFOSR-2592-74
Availability: Pub. in Transactions of the American Mathematical Society, v195 p1-29 1974.

Descriptors: *Complex variables, *Analytic functions, *Ellipses, *Algebra, Distribution functions, Reprints.
Identifiers: *Hypercomplex variables, *Elliptic systems, *Hyperanalytic functions.

Lipman Bers and Illya Vekua extended the concept of an analytic function by considering the distributional solutions of elliptic systems of two equations with two unknowns and two independent variables. These solutions have come to be known as generalized (or pseudo) analytic functions. Subsequently, Avron Douglis introduced an algebra and a class of functions which satisfy (classically) the principal part of an elliptic system of 2r equations with 2r unknowns and two independent variables. In Douglis' algebra these systems of equations can be represented by a single 'hypercomplex' equation. Solutions of such equations are termed by hyperanalytic functions. In this work, the class of functions studied by Douglis is extended in a distributional sense much in the same way as Bers and Vekua extended the analytic function. We refer to this extended class of functions as the class of generalized hyperanalytic function.

AD-A011 640/0GA PC$3.25/MF$2.25
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Controllability and Time-Optimal Control of Systems with Slow and Fast Modes,
P. V. Kokotovic, and A. H. Haddad. 4 Apr 74, 4p AFOSR-TR-75-0636
Contract DAAB07-72-C-0259, Grant AF-AFOSR-2570-73
Availability: Pub. in IEEE Transactions on Automatic Control, p111-113 Feb 75.

Descriptors: *Control theory, *Linear Systems, *Optimization, Time, Control systems, Automatic, Reprints.
Identifiers: *Time optimal control, *Automatic control.

The controllability of linear systems with large and small time constants (singularly perturbed systems) is established. The time-optimal control of such systems is shown to be separable into two time scales related to the slow and fast modes of the system. An approximate design method of the time-optimal control is proposed, which is based on the separability of the fast and slow controls. (Author)

AD-A011 658/2GA PC$3.25/MF$2.25
Michigan Univ Ann Arbor Dept of Mathematics
Graph Theory with Applications to Air Force Systems.
Interim rept.,
Frank Harary. 29 Apr 75, 7p AFOSR-TR-75-0805
Grant AF-AFOSR-2502-73
See also report dated 30 Aug 74, AD/A-003 983.

Descriptors: *Graphics, Topology, Combinatorial analysis, Matrices(Mathematics).
Identifiers: *Graph theory.

The various theoretical results outlined are concerned with such matters as the structure of graphs having a maximum and minimum number of 'cliques' as used in clustering and classification schemes, with the enumeration of acyclic configurations of generalizations of mathematical models of the biological growth cells and paving problems in statistical mechanics, with properties of 'anticritical' graphs such as point and line-connectivity, with duals of tree graphs, with enumeration of random walks in graphs in terms of the moments of the eigenvalues of their adjacency matrices, and with determining the minimum number of prints of a digraph which must be removed so that the result is acyclic, i.e., finding the minimum feedback vertex set of a digraph. The report also provides a listing of the publications in which the detailed accomplishments are presented.

AD-A011 664/0GA PC$3.25/MF$2.25
California Univ Los Angeles Dept of System Sciences
White Noise vs. Wiener Process Models in Filtering and Control,
A. V. Balakrishnan. Sep 74, 4p AFOSR-TR-75-0859
Grant AF-AFOSR-2492-73

Descriptors: *Control theory, Stochastic processes, White noise, Mathematical models.
Identifiers: Continuous time systems, Wiener filters, *Stochastic control, Wiener processes, Filtering theory.

Continuous time stochastic system models involving a Wiener process model for the additive noise on the observed process are inappropriate in actual use when nonlinear Ito integrals in the observed data have to be instrumented, and thus much of current nonlinear filtering theory is of questionable practical utility. White noise models would appear to be more appropriate and this is illustrated by a canonical problem in system identification, both in terms of band-limited approximation of Ito integrals and in terms of direct white noise integrals.

AD-A011 666/5GA PC$3.25/MF$2.25
Princeton Univ N J Dept of Electrical Engineering
Properties of the Coefficients in a Diagonal Series Expansion of a Bivariate Density.
Interim rept.,
G. L. Wise, and J. B. Thomas. Apr 75, 7p
AFOSR-TR-75-0803
Grant AF-AFOSR-2101-71

Descriptors: *Statistical analysis, Probability density functions, Inequalities, Random variables, Theorems.
Identifiers: *Bivariate density functions.

Diagonal series expansions of bivariate densities in terms of orthonormal functions are considered. If the n-th orthonormal function is an n-th degree polynomial, the bivariate density belongs to the class lambda introduced by Barrett and Lampard. It is shown that, if a class lambda bivariate density has identical marginal densities with unbounded support, then the coefficient sequence must be a mement sequence. Averaging over a parameter in the coefficient sequence is considered and is used to derive two new class lambda bivariate densities. Also, the coefficients are related to some dependency measures.

AD-A011 674/9GA PC$5.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Almost Periodic Solutions to Difference Equations.
Technical rept.,
Alvin Bayliss. May 75, 119p Rept no. IMM-409
AFOSR-TR-75-0816
Grants AF-AFOSR-2728-74, NsG-5034

Descriptors: *Difference equations, Partial differential equations, Banach space, Numerical integration, Theorems.
Identifiers: *Periodic solutions, *Almost periodic functions, Existence theorems.

The theory of Massera and Schaffer relating the existence of unique almost periodic solutions of an inhomogeneous linear equation to an exponential dichotomy for the homogeneous equation has been completely extended to discretizations by a strongly stable difference scheme. In addition it has been shown that the almost periodic sequence solution will converge to the differential equation solution at a rate O(k sup p) where p is the accuracy of the scheme, uniformly in t, if the coefficients are sufficiently smooth. The preceding theory has also been applied to a class of exponentially stable partial differential equations to which one can apply the Hille-Yoshida Theorem. It is possible to prove the existence of unique almost periodic solutions of the inhomogeneous equation which can be approximated by almost periodic sequences which are the solutions to appropriate discretizations. Two methods of discretizations are discussed; the strongly stable scheme described above and the Lax-Wendroff scheme.

AD-A011 678/0GA PC$3.25/MF$2.25
Pittsburgh Univ Pa Dept of Mathematics
Nonparametric and Sequential Analysis of Life Testing and Reliability Problems.
Final scientific rept. 1 May 72-30 Apr 75,
Asit P. Basu. 1975, 7p AFOSR-TR-75-0677
Grant AF-AFOSR-2352-72

Descriptors: *Nonparametric statistics, *Sequential analysis, Sampling, Weibull density functions, Bayes theorem, Reliability, Life tests.
Identifiers: Bivariate density functions, Exponential density functions, Order statistics.

The principal investigator and his collaborators considered a number of problems. The first of these deals with the two-sample problem with incomplete data. The second problem considered is the classification and selection rules for the exponential populations. The third problem area considered is to find a good simple approximation for the variance and covariance of order statistics from the Weibull distribution. A fourth problem area considered is the bivariate exponential distribution.

COM-74-50458-04/GA
PC-GPO/MF$2.25-NTIS
National Bureau of Standards, Washington, D.C.
Journal of Research of the National Bureau of Standards: B: Mathematical Sciences, Volume 78B, Number 4, Oct-Dec 1974.
Quarterly rept.
1974, 52p NBS-JRB-78-4
Library of Congress Catalog Card no. 62-4414.
See also Quarterly rept. no. 3, COM-74-50458-03.
Paper copy available from GPO as C13.22/secB:78B(4).

Descriptors: *Mathematics, *Reviews, Matrices(Mathematics), Trees(Mathematics), Graph theory, Special functions, Exponential functions, Computer programs.

Contents:
Saddlepoints in P-pivot classes of skew matrices;
Maximizing the number of spanning trees in a graph with n nodes and m edges;
The field of values and spectra of positive definite multiples;
Automatic computing methods for special functions-part 2-the exponential integral (E sub n)(x).

COM-75-10812/6GA PC$3.75/MF$2.25
Office of Telecommunications, Boulder, Colo. Inst. for Telecommunication Sciences.
A Method of Bivariate Interpolation and Smooth Surface Fitting Based on Local Procedures,
Hiroshi Akima. Mar 73, 47p OTR-73-7

Descriptors: *Curve fitting, *Interpolation, Polynomials, Geometric surfaces, Computation, Computer programs, FORTRAN.

A method is designed for interpolating values given at points of a rectangular grid in an x-y plane by a smooth bivariate function z=z(x,y). The interpolating function is a bicubic polynomial in each cell of the rectangular grid. Emphasis is on avoiding excessive undulation between given grid points.

COM-75-50346/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Formulas and Multiplicative Relationships for the Parameters of Subgroups of the Modular Group.
Final rept.,
Morris Newman. 1974, 10p
Pub. in Mathematische Annalen, v212 p173-182 1974.

Descriptors: *Group theory, Set theory, Congruences.
Identifiers: Reprints.

Explicit formulas in terms of coset decompositions are derived for the parabolic class number and elliptic class numbers of any subgroup of finite index of the classical modular group Gamma. It is shown that these are multiplicative arithmetic functions of the level for congruence subgroups of Gamma.

COM-75-50368/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
A Supplementary List of Publications of S. S. Wilks.
Final rept.,
Churchill Eisenhart. Feb 75, 3p
Pub. in Amer. Statist., v29 n1 p25-27 Feb 75.

Descriptors: *Mathematics, *Documents.
Identifiers: Reprints, Wilks S S.

Full bibliographic citations for thirty-one 'other writings' of Samuel Stanley Wilks not included in 'The Publications of S. S. Wilks', in February 1965 issue of the Annals of Mathematical Statistics (Vol. 36, no. 1, pp.24-27), together with the observation that his writings and those of his younger brother, Syrrel Singleton Wilks, are lumped together under 'S.S. Wilks' in the volumes of the Science Citation Index.

N75-23204/1GA PC$6.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Digital Program for Solving the Linear Stochastic Optimal Control and Estimation Problem.
L. C. Geyser, and B. Lehtinen. Mar 75, 167p
NASA-TN-D-7820, E-8016

Descriptors: *Computer programs, *Linear systems, *Optimal control, *Stochastic processes, Digital data, Eigenvalues, Ibm computers, Kalman filters, Liapunov functions, Problem solving, Riccati equation.

For abstract, see STAR 1314

N75-23209/0GA PC$3.75/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Dept. of Mathematics.
Generalized du Fort-Frankel Methods for Parabolic Initial Boundary Value Problems.
D. Gottlieb, and B. Gustafsson. 1975, 32p
NASA-CR-132653
Contract NGR 47-102-001

Descriptors: *Approximation, *Boundary value problems, *Matrix theory, Finite element method, Operators (Mathematics), Parabolic differential equations.

For abstract, see STAR 1314

N75-23211/6GA PC$5.25/MF$2.25
New York Univ., N.Y. Courant Inst. of Mathematical Sciences.
Almost Periodic Solutions to Difference Equations.
A. Bayliss. May 75, 119p NASA-CR-142704, IMM-409
Grant NSG-5034, Contract AF-AFOSR-2728-74

Descriptors: *Difference equations, *Partial differential equations, *Problem solving, Linear equations, Nonlinear equations, Roots of equations.

For abstract, see STAR 1314

N75-23215/7GA PC$3.75/MF$2.25
National Physical Lab., Teddington (England). Div. of Numerical Analysis and Computing.
On an Algorithm for Polynomial Deflation by Broyden and Ford.
G. Peters, and J. H. Wilkinson. Sep 74, 27p NPL-NAC-55

Descriptors: *Algorithms, *Least squares method, *Polynomials, Convergence, Iteration, Matrices (Mathematics).

For abstract, see STAR 1314

12B. Operations Research

AD-A011 183/1GA PC$4.25/MF$2.25
Massachusetts Inst of Tech Cambridge Operations Research Center
Annual Report, July 1, 1973 through June 30, 1974.
30 Jun 74, 62p
See also AD-735 756.

Descriptors: *Operations research, Mathematical programming, Control theory, Decision theory, Stochastic processes, Mathematical models, Optimization.

Contents: Research activities--Mathematical methods--Mathematical programming and optimal control, Decision analysis, statistics and stochastic systems; Models and applications--Public systems, Traffic and transportation, Industrial and management systems; Educational activities--Subjects offered by operations research center staff, Operations research seminar and workshop, O.R. related theses completed; Professional activities; Administration.

AD-A011 400/9GA PC$3.75/MF$2.25
Florida Univ Gainesville Dept of Industrial and Systems Engineering
A Minimax Facility Layout Problem Involving Distances Within and Between Facilities.
Technical rept.,
Richard L. Francis, John J. Bartholdi, and Robert L. Papineau. Apr 75, 35p Rept no. RR-75-2 ARO-10841.10-EL
Grants DA-ARO-D-31-124-72-G123, NSF-GK-41224

Descriptors: *Facilities, *Minimax technique, Mathematical models, Set theory, Theorems.
Identifiers: *Layout problems, Quadratic assignment problem.

This paper presents a simple solution procedure for the problem of laying out n facilities, where each facility takes up a planar region of known area but with shape not prespecified, so as to minimize the maximum of the following terms: the greatest of the rectilinear distances between all pairs of regions; the greatest of the rectilinear distances within specified regions. The procedure for finding minimax layouts provides several qualitative insights which suggest design guidelines; virtually closed form answers are obtained.

AD-A011 665/7GA PC$3.75/MF$2.25
California Univ Los Angeles Dept of System Sciences
Deterministic Differential Games,
C. Marchal. Feb 75, 43p Rept no. UCLA-ENG-0675 AFOSR-TR-75-0808
Grant AF-AFOSR-2492-73

Descriptors: *Game theory, Control theory, Convex sets, Optimization.
Identifiers: *Differential games, Two person games, Zero sum games.

The optimality theory of Pontryagin is generalized to the deterministic two-player zero-sum differential games. It gives, for each value of the performance index, a systematic way to build the 'separatrix', i.e., the set lying between region of the playing space corresponding to larger performance indices. As for the optimality theory itself, its present generalization gives only necessary conditions. It is sometimes insufficient to the first order, and it has to be improved.

N75-23229/8GA PC$3.25/MF$2.25
California Univ., Berkeley.
N-Player Stochastic Differential Games.
P. Varaiya. 26 Nov 74, 16p NASA-CR-142674, ESL-P-578
Contracts NGL-22-009-124, F44260-71-C-0087
Conf-Prepared in Cooperation with MIT, Cambridge, Mass.

Descriptors: *Brownian movements, *Game theory, *Stochastic processes, Control theory, Equilibrium equations, Problem solving, Theorem proving.

For abstract, see STAR 1314

PB-242 157/6GA PC$4.25/MF$2.25
Carnegie-Mellon Univ., Pittsburgh, Pa.
A User Manual for Geometric Programming.
Technical rept.,
Abrahim Lavi. 15 Dec 74, 69p
NSF/RANN/SE/GI-39114/TR/74-5 NSF/RA/N-74-199
Grant NSF-GI-39114

Descriptors: *Mathematical programming, Inequalities, Optimization, Computer programs, Programming manuals.
Identifiers: *Geometric programming, Duality theory.

Geometric programming as an optimization tool is explained in simple language with as few mathematical concepts as possible. A computer code for solving geometric programming problems is provided. This code was developed by Westinghouse Research and Development Center and was made available to CMU gratis. The steps to be followed in using the program are given in detail; sample problems are solved, and the computer output is displayed and explained.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A011 281/3GA PC$3.75/MF$2.25
Eimac San Carlos Calif
Turret Integrated Xenon Illuminator.
Final technical rept. Apr-Sep 74,
Gordon Liljegren. Jan 75, 45p Rept no. EIMAC-TR-74-4
Contract DAAK02-74-C-0200

Descriptors: *Xenon lamps, *Searchlights, Infrared filters, Low voltage, Reflectors, Optical equipment, Electronic equipment.
Identifiers: Design.

A program has been completed providing a Turret Integrated Xenon Illuminator (TIXI) brassboard. The TIXI consists of an optical unit, a power supply and a control box. The TIXI is a modified version of the 'Sealed Beam Integrated Reflector Searchlight'. The optical unit has an overall length of 25 1/2 inches, is approximately 6 3/8 inches in diameter and weighs less than 50 lbs. The unit features a sealed beam integral reflector, 1 KW, xenon short arc low voltage starting lamp. Other features include a self contained cooling fan, a beam elevation control (+20 to -10 degrees), a beam spread mechanism, an infrared filter mechanism, a ballast resistor, a quick disconnect lamp assembly for easy replacement, ozone free operation and a braking mechanism to hold the beam elevation rotating cylinder in place when the searchlight is not in use.

COM-75-10684/9GA PC$5.75/MF$2.25
National Bureau of Standards, Washington, D.C. Center for Building Technology.
Underground Heat and Chilled Water Distribution Systems. Proceedings for the Symposium on Underground Heat and Chilled Water Distribution Systems Held in Washington, D.C., on November 26-27, 1973.
Final rept.,
Tamami Kusuda. May 75, 149p* NBS-BSS-66
Paper copy also available from GPO as C13.29:2/66. Library of Congress Catalog Card No. 75-619005.

Descriptors: *Heat distributing units, *Piping systems, *Meetings, Underground corrosion, Underground facilities, Thermal insulation, Specifications, Water pipes, Heat transfer, Design criteria, Corrosion prevention, Economic analysis.
Identifiers: District heating, Central heating plants.

The publication contains the keynote address and all the technical papers presented during the Symposium on Underground Heat and Chilled Water Distribution Systems, which was held on November 26 and 27, 1973 in Washington, D.C. The Symposium was sponsored jointly by the National Bureau of Standards, the National Capital Chapter of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, the Building Research Institute and the Association of Physical Plant Administrators. The subject matter covered in the papers includes energy, economics, design criteria, heat transfer, corrosion protection, specification, operation, and maintenance related to underground pipes.

COM-75-10685/6GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Thermal Engineering Section.
Method of Testing for Rating Thermal Storage Devices Based on Thermal Performance.
Interim rept.,
George E. Kelly, and James E. Hill. May 75, 46p NBSIR-74-634
Sponsored in part by Energy Research and Development Administration, Washington, D.C.

Descriptors: *Heat storage, Test methods, Standards.
Identifiers: Thermal storage devices.

A study was made at the National Bureau of Standards of the different techniques that could be used for testing thermal storage devices and rating them on the basis of thermal performance. This document outlines a proposed standard test procedure based on that study. It is written in the format of a standard of the American Society of Heating, Refrigerating, and Air Conditioning Engineers and specifies the recommended apparatus, instrumentation, and test procedure.

COM-75-10689/8GA PC$4.25/MF$2.25
National Bureau of Standards, Washington, D.C.

Site Analysis and Field Instrumentation for an Apartment Application of a Total Energy Plant.
Final rept.,
John B. Coble, and Paul R. Achenbach. 19 May 75, 65p NBSIR-75-711
Sponsored in part by Department of Housing and Urban Development, Washington, D.C. Presented at the Intersociety Energy Conversion Engineering Conference (7th), San Diego, Calif., 25-29 Sep 72.

Descriptors: *Total energy systems, *Energy conservation, Electric power generation, Air conditioning, Space heating, Hot water heating, Equipment, Instrumentation, Planning, Apartment buildings, New Jersey.
Identifiers: Breakthrough operation, Jersey City(New Jersey).

Under sponsorship of the Department of Housing and Urban Development, the National Bureau of Standards developed criteria in a feasibility study to select a site for, and to evaluate the requirements of a total energy system on one or more OPERATION BREAKTHROUGH housing sites. The total energy system produces its own electrical, heating and cooling energy services independent of the local utility system. A Jersey City site was chosen as the location for the installation, evaluation, and field study of the total energy system.

NTIS/PS-75/549/6GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Cooling Towers (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Audrey S. Hundemann. Jul 75, 128p*

Descriptors: *Cooling towers, *Bibliographies, *Nuclear power plants, *Electric power plants, Environmental impacts, Design, Air pollution, Water pollution, Atmospheric motion, Plumes.

Abstracts dealing with design and environmental impacts of wet and dry cooling towers are presented. Cooling tower drift instrumentation and thermal and chemical pollution control systems are covered. Most abstracts pertain to cooling towers used in nuclear power plants; a few abstracts pertain to cooling towers used in wastewater treatment. (Contains 123 abstracts).

N75-22903/9GA PC$5.75/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Solar Residential Heating and Cooling System Development Test Program.
W. R. Humphries, and D. E. Melton. Sep 74, 129p NASA-TM-X-64924

Descriptors: *Air conditioning, *Energy policy, *Solar heating, Energy storage, Heat transfer, Solar collectors, Solar energy conversion.

For abstract, see STAR 1314

PAT-APPL-561 767/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Cold Cylinder Assembly for Cryogenic Refrigerator.
Patent Application,
Richard D. Doody. Filed 25 Mar 75, 9p Rept no.

Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Cryogenics, *Refrigeration systems, Gas flow, Regeneration(Engineering), Crankcases, Ports(Openings), Patents.
Identifiers: *Cryogenic refrigerators, *Patent applications, PAT-CL-165-10.

The patent application relates to the cold cylinder assembly for a two stage Vuilleumier cycle cryogenic refrigerator having an outer cylinder forming a first chamber of a large diameter and a second chamber of a smaller diameter with a cold displacer within the cylinder. The cold displacer includes a first stage regenerator and a second stage regenerator. Gas from the crankcase passes through channels in the rider ring and then through ports to an annular passage within the cold displacer and then to the first stage regenerator. Gas from the first stage regenerator divides into two parts with one part passing to the second stage regenerator and then through passages to ports to impinge on an end member for the second stage heat load. The other part flows through passages to ports to impinge upon an end wall for the first stage heat load.

PATENT-3 874 188 Not available NTIS
Department of the Air Force Washington D C
Air Cycle Cooling System with Rotary Condensing Dehumidifier.
Patent,
Eugene A. Zara, Lawrence L. Midolo, and William C. Savage. Filed 9 May 74, patented 1 Apr 75, 5p Rept nos. PAT-APPL-468 326, Supersedes AD-164 830.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Aircraft, *Air conditioning equipment, *Patents, Dehumidifiers, Heat exchangers, Valves.
Identifiers: PAT-CL-62-272.

The patent describes an air cycle cooling system having a rotary condensing dehumidifier wherein the air from the compressor is passed through the vanes of a transverse flow heat exchanger with the cooled air from the expansion turbine being passed over the external surfaces of the vanes to thereby cool the air within the vanes. The cooling of the air within the vanes causes the moisture to be condensed. The water in the vanes is moved along with the moving air by viscus interaction. The water collects in the end member of the transverse flow heat exchanger and is removed by centrifugal force through poppet valves.

PB-242 507/2GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
Coal Preheating-Combustion System Design and Operation with Regard to Plant Safety,
S. Pilkington. Apr 75, 21p BISRA-GS/TECH/MISC/88/74/C

Descriptors: *Heating equipment, *Coal, *Safety engineering, Heating, Hazards, Control, Industrial control, Great Britain.

The study considers the design and operation of the preheater combustion system and its interaction with the process, from the viewpoint of safe operation. The principal hazard lies in the possibility of generating combustible mixtures of fuel gas and air within the preheater and is due to the recycling of hot gases. It is concluded that control of the burner air:fuel ratio is critical and that safe operation under steady conditions is adequately covered by current designs. Control under changing conditions is considered to be inadequate and a better understanding of the dynamic response of the preheater is necessary in order to improve this situation. When manual control is to be used, as during start-up, insufficient consideration has been given to prevent unsafe conditions arising from possible operator error. The effectiveness of preheater purging procedures has been examined. It is recommended that during commissioning of new plant, checks should be made on combustion chamber performance and on the effectiveness of purging procedures.

13B. Civil Engineering

AD-A011 213/6GA PC$7.25/MF$2.25
Battelle Columbus Labs Ohio
Influence of Environmental Factors on Selected Amelioration Techniques for Discharges of Hazardous Chemicals.
Final rept.,
S. Srinivasan, T. Thomas, A. Gezen, A. Coyle, and C. Kimm. Feb 75, 221p Rept no. CG-D-81-75 USCG-D-81-75
Contract DOT-CG-23223-A-18

Descriptors: *Air pollution, *Water pollution, *Chemicals, Discharge, Hazards, Environmental protection, Materials, Assessment, Dispersing, Spilling, Methodology, Transport properties, Diffusion, Meteorological data.
Identifiers: *Air pollution abatement, *Water pollution abatement, Recommendations, DOT/5C.

The influence of environmental conditions on selected potential amelioration techniques for discharges of selected hazardous chemicals was determined. Historical discharge data was examined to establish categories of spill sizes. The range of environmental conditions (air and water) encountered in discharge situations was determined. Model case studies were performed to assess the magnitude of dispersion in air and/or water. Evaluations were then made to determine if and to what extent the selected amelioration techniques would be influenced by the pertinent environmental conditions. Favorable environmental conditions were also summarized.

AD-A011 236/7GA PC$3.25/MF$2.25
Army Mobility Equipment Research and Development Center Fort Belvoir Va
Investigating Waste Oil Disposal by Direct Incineration.
Final rept.,
Maurice E. LePara, and Gerald DeBono. Feb 75, 21p Rept no. USAMERDC-2127
See also report dated Jan 74, AD-772 911.

Descriptors: *Fuel oil, *Oils, *Incinerators, *Waste disposal, Air pollution, Wastes(Industrial), Crankcases, Recycled materials, Smoke stacks, Monitoring, Combustion, Tables(Data).
Identifiers: *Oil wastes.

A second combustion-emissions test program was conducted at Aberdeen Proving Ground, Maryland, to address the feasibility for disposal of waste oil products by direct incineration. A 'referee' waste oil, composed primarily of automotive crankcase drains, was blended into No. 2 Fuel Oil and combusted in a burner-boiler powerplant located at the messhall facility. During this steady-state combustion, the stack emissions were monitored by the U.S. Army Environmental Hygiene Agency to define the effects of the waste oil fraction on particulate emission rates. It was noted that particulate emissions increased significantly with the addition of the waste oil component, and indications were given that waste oil stratification could be a problem.

AD-A011 250/8GA PC$3.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Hook Anchor Tests in Frozen and Unfrozen Ground,
Austin Kovacs. May 75, 38p Rept no. CRREL-SR-229

Descriptors: *Anchors(Structural), Loads(Forces), Soils, Freezing, Installation, Removal.

Identifiers: Holding capacity, *Cold weather construction, *Frozen soils.

The findings of an exploratory study of the holding capacity of hook anchors in frozen and unfrozen ground are presented. Testing revealed that hook anchors are capable of being driven and retrieved from frozen silt and that their holding capacity was reasonably high in comparison to their size. Hook anchor capacity in the frozen silt at -2C was found to be three times higher than in the unfrozen silt.

AD-A011 263/1GA PC$4.25/MF$2.25
Army Medical Bioengineering Research and Development Lab Fort Detrick Md
Land Application of Wastewater: The Fate of Viruses, Bacteria and Heavy Metals at a Rapid Infiltration Site.
Technical rept. May 72-May 75,
Stephen A. Schaub, Charles A. Sorber, Eugene P. Meier, and Joseph R. Kolmer. May 75, 59p Rept no. TR-7201

Descriptors: *Water pollution, *Sewage disposal, *Soils, Percolation, Ground water, Waste water, Adsorption, Land use, Coliform bacteria, Bacteriophages, Filtration, Viruses, Heavy metals, Carbon compounds, Organic compounds, Tracer studies, Sampling.
Identifiers: Path of pollutants.

One mode of land application of wastewater, rapid infiltration (RI), was studied to determine if significant quantities of specific microbiological and chemical wastewater constituents could percolate into the ground water. The RI site selected for study had been in operation for over 30 years. Primary sewage effluent was used for rapid infiltration/percolation. Results indicated that neither renovated (replacement of top 3-4 feet of soil) nor unrenovated RI cell soils were capable of adsorbing viruses from primary effluent. Tracer bacteriophage penetrated into the ground water along with the percolating wastewater. The tracer and indigenous enteroviruses were sporadically detected in the ground water at horizontal distances up to 600 feet from the application point. Enteric indicator bacteria were readily concentrated on the soil surface, principally by filtration. A comparison of heavy metals and total organic carbon in the upper soil layers of renovated and unrenovated cells revealed their accumulation at the soil surface. The high metal and organic carbon concentrations disappeared from this layer after prolonged cessation of wastewater application.

AD-A011 266/4GA PC$3.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Reliability of Rubble-Mound Breakwater Stability Models.
Final rept.,
Robert Y. Hudson. Jun 75, 44p Rept no. AEWES-Misc-Paper-H-75-5

Descriptors: *Breakwaters, *Hydraulic models, Ocean waves, Coastal regions, Model theory.
Identifiers: Similarity theory, Rubble mounds.

Designing rubble-mound breakwaters to withstand the forces of wave action in such a way as to obtain safe and economical structures is difficult. It is necessary in many cases, therefore, to conduct scale-model investigations to determine the optimum design. The purpose of this report is to explain the basis upon which rubble-mound stability models are designed, constructed, and operated, and to provide information from which the accuracy of such models can be appraised. It was concluded that hydraulic scale models can be used to determine the stability of rubble-mound breakwaters, and that the accuracy of the test results will fall within the limits required to design safe and economical prototype structures, if the model is designed and operated correctly and the test conditions are selected judiciously.

AD-A011 267/2GA PC$7.25/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
River Point Directory for the Mississippi River-Gulf Coast Inland Waterways System.
Final rept.,
Larry L. Daggett, and Robert W. McCarley. May 75, 224p Rept no. AEWES-Misc-Paper-H-75-6

Descriptors: *Directories, *Navigation, *Inland waterways, Rivers, Streams, Waterways, Commodities, Water traffic, Commerce, Docks, Coding, Data bases.
Identifiers: *Mississippi River, Gulf Coast Region(United States), Geocoding.

The River Point Directory is a quick-reference working document for use by engineers and planners in the general fields of river navigation and waterborne commodity movements. All navigable rivers, bayous, streams, and other such waterways in the Mississippi River-Gulf Coast region are included. The rivers included in the Directory are, in general, listed in the order of their importance as commodity transportation arteries with regard to varying degrees of impact on the economic welfare of the United States. Most of the relatively minor streams and bayous are listed under the three responsible U.S. Army Corps of Engineers Districts: Mobile, New Orleans, and Galveston. The Directory is, in essence, a compilation of significant data relating to each commercial dock, town, landing, navigation lock, bridge, junction, and other such river points contained in selected portions of the U.S. Army Engineer Waterborne Commerce Statistical Center (WCSC) Port and Dock Code Manual (Parts 2 and 3), dated 1 January 1973.

AD-A011 269/8GA PC$5.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss Pavements/Soil Trafficability Info Anal Ctr
Microthesaurus of Vehicle Mobility, Environment, and Pavement Terms.
Apr 75, 135p Rept no. PSTIAC-1

Descriptors: *Vehicles, *Mobility, *Environmental tests, *Pavements, *Thesauri, Military research, Index terms, Trafficability, Soil mechanics, Terrain, Ice, Construction, Roads, Landing fields, Weather, Construction materials, Amphibious vehicles, Performance(Engineering), Aircraft, Military vehicles, Test equipment, Test methods.
Identifiers: Design, Microthesauri.

The terms in the microthesaurus cover three major areas of interest: Vehicle mobility, environment, and pavements, as related primarily to military research. Non-technical terms common to all subject areas in research and development are included to provide a complete vocabulary of concepts. The microthesaurus will become part of a larger version encompassing several subject areas of particular interest at the U.S. Army Engineer Waterways Experiment Station. The format, rules, and conventions used in this document generally follow those recommended by the Committee on Scientific and Technical Information (COSATI), and used in the Thesaurus of Engineering and Scientific Terms (TEST).

AD-A011 275/5GA PC$9.50/MF$2.25
Aerojet Electrosystems Co Azusa Calif
Development of a Prototype Airborne Oil Surveillance System.
Final rept.,
A. T. Edgerton, J. J. Bommarito, R. S. Schwantje, and D. C. Meeks. May 75, 327p Rept no. AESC-1812FR-1 USCG-D-90-75
Contract DOT-CG-22170-A

See also Volume 3, AD-779 484.

Descriptors: *Oil spills, *Remote detectors, Airborne, Engineering drawings, Infrared detectors, Side looking radar, Microwave equipment, Specifications, Television systems, Low light levels, Position finding, Display systems, Water pollution, Reliability.
Identifiers: *Oil pollution detection, Remote sensing, Airborne oil surveillance system.

A prototype airborne oil surveillance system was developed for the U.S. Coast Guard by Aerojet ElectroSystems Company. The multisensor system permits real-time day/night, all-weather detection, mapping and documentation of oil spills at sea. The system was installed aboard a Coast Guard HU-16 Albatross and flight tested off the California Coast. Surveillance data were obtained from natural seeps, a series of controlled oil spills, routine shipping and targets of opportunity. The airborne system consists of a sidelooking radar, a passive microwave imager, a multispectral low light level TV, a multichannel line scanner, a position reference system, and a real-time processor/display console. The system reliably detected and mapped oil spills and seeps for conditions ranging from dense undercast to clear, wind speeds from 0 to 26 knots and daytime to total darkness. Test results demonstrate that airborne oil surveillance is practical and the system can be invaluable to other Coast Guard missions. Color illustrations reproduced in black and white.

AD-A011 338/1GA PC$5.75/MF$2.25
Western Illinois Univ Macomb Public Policy Research Inst
Flood Hazard and Patterns of Urban Development in the Upper Midwest,
Daniel Singer, and Norman Walzer. Jan 75, 148p
Contract DACW25-75-C-0010

Descriptors: *Floods, *Urban areas, Damage, Flood plains, Protection, Flooding, Hazards, Population, Demography, Economics, Methodology, Forecasting, Predictions, Tables(Data), Illinois, Iowa, Missouri, Minnesota, Wisconsin.
Identifiers: *Flood forecasting.

This study was undertaken to examine the relationships between the economic structure in urban areas subject to flood hazard and their flood damage potential in order to develop a systematic methodology for forecasting future flood damage. As a by product of this analysis, insight into alternative policies controlling flood plain development was obtained. Topics discussed include the following: Patterns of economic development; Flood hazard, flood protection, and population characteristics; Future population growth in the Rock Island District; Projected population growth and flood hazard in the Rock Island District; Average annual flood damage projections.

AD-A011 342/3GA PC$3.25/MF$2.25
Naval Biomedical Research Lab Oakland Calif
Hydrocarbons Associated with Suspended Particulate Matter in San Francisco Bay Waters,
L. H. DiSalvo, and H. E. Guard. 1975, 5p
Contract N00014-69-A-0200-1001

Descriptors: *Water pollution, *Hydrocarbons, *Sediments, *San Francisco Bay, Sampling, Thin layer chromatography, Gas chromatography, Mussels, Chemical properties, Saturated hydrocarbons, Aromatic hydrocarbons, Tables(Data).
Identifiers: *Suspended sediments, Mytilus edulis.

Suspended sediments were obtained at seven stations in San Francisco Bay during the

summer of 1974 using a double settling tube device termed the 'biosampler.' One tube of the device passively collected suspended sediments which settled from ambient waters at the sampling sites. The top of the second tube contained bay mussels (Mytilus edulis) as biological agents for the active entrapment and deposition of suspended particulates occurring in the water. Presence of the mussels in the sampler was, in most cases, indispensable for collection of sufficient amounts of material for analysis over one-week sampling periods. A thin-layer chromatographic method was employed for analysis of total alkane and total aromatic hydrocarbons in recovered sediments. The sediments were found to contain 190-6188 ppm dry weight of total hydrocarbons, with alkane-aromatic ratios varying from 1.1 to 5.1.

AD-A011 396/9GA PC$4.25/MF$2.25
Army Engineer Div North Pacific Bonneville Oreg Div Hydraulic Lab
Intake Manifolds and Emptying Valves for Lower Monumental Lock Snake River, Washington.
Final rept.,
Louis Z. Perkins, and Harry P. Theus. May 75, 58p Rept no. TR-105-1

Descriptors: *Dams, *Hydraulic models, Water flow, Vortices, Intake valves, Flow rate, Washington(State).
Identifiers: Monumental Dam, Snake River, Locks(Waterways).

Flow conditions at proposed intakes and performance of a conventional tainter emptying valve for the navigation lock at Lower Monumental Dam were studied in a 1:25-scale model. Vortexes occurred over the land wall intake or original design (plan A) during a portion of the filling operation; eddies along the river wall dissipated before a vortex could form. With the adopted intake (plan I), vortexes were absent during tests with steady flow into the lock chamber. Dimples that would indicate incipient vortexes in the model were not evident during filling operations at an initial head of 117 ft (maximum lock inflow increased 10 percent) when two adjacent spillway bays were closed, when both intakes were open, or when the river wall intake was closed. Intermittent dimples formed when the spillway flow averaged 10,000 cfs per bay and when the land wall intake was closed.

AD-A011 397/7GA PC$3.75/MF$2.25
Army Engineer Div North Pacific Bonneville Oreg Div Hydraulic Lab
Spillway Gate Modification Bonneville Dam, Columbia River, Oregon and Washington.
Final rept.,
Theodore D. Edmister, and Peter M. Smith. May 75, 50p Rept no. TR-136-1

Descriptors: *Dams, *Hydraulic models, Rivers, Water flow, Hydraulic equipment, Piers, Baffles, Seals(Stoppers), Oregon, Washington(State).
Identifiers: Columbia River, Bonneville Dam, Spillways, Hydraulic gates, Check structures.

Model investigation verified that vertical vibration of the Bonneville spillway gates was caused by flow instability beneath the gate. When the gate bottom was submerged by tailwater and the gate was at certain openings, the line of flow control shifted back and forth between the gate seal near the center of the bottom and the upstream face of the gate. Pressure changes accompanying the control shifts created large changes in vertical force on the upstream half of the gate bottom. A bottom shape with a longer lip for better flow control was developed. The new shape was structurally feasible, usable in either set of existing gate slots without modification of embedded seal plates, and operable at all gate openings with negligible vertical vibration. Other shapes not usable with existing seal plates were developed but were considered less suitable.

AD-A011 434/8GA PC$3.25/MF$2.25
Office of Naval Research London (England)
Water Resources and Water Utilization in Israel,
Robert Dolan. 30 May 75, 16p Rept no. ONRL-R-6-75

Descriptors: *Water resources, *Israel, Symposia, Water supplies, Ground water, Desalination, Storage, Distribution, Fresh water, Consumption, Management.
Identifiers: Brakish water, *Water utilization, Water management.

The report provides an overview of Israel's water budget and water economy to serve as the context for a more detailed discussion of results reported at the International Symposium on Brackish Water, held in Israel in January 1975.

COM-75-10693/0GA PC$5.25/MF$2.25
Hydronautics, Inc., Laurel, Md.
Development of a Batchwise In-Situ Regeneration Type Separator to Remove Oil from Oil-Water Suspensions.
Final rept.,
Daniel H. Fruman. Dec 74, 117p TR-7080-3 MA-RD-930-75060
Contract MA-0-35467

Descriptors: *Ballast, *Oils, *Separators, *Ships, Foam, Water pollution, Water, Tests, Reclamation, Filtration, Performance evaluation, Materials recovery, Design.
Identifiers: *Oil water separators, Water pollution control, Oil pollution control, *Bilge water.

The report documents the design test and evaluation of a 600 gpm oil-water separator for ballast water treatment. The basis of the particular separation concept used in this development program resides in the use of a very thick, open reticulated, oleophilic foam which is capable of separating the dispersed oil phase from the aqueous continuous phase independently of the oil density and which is amenable to regeneration by simple expression. The tests of the oil-water separation at the Navy Fuel Reclamation Plant are described. The performance of the separator in relation to the test conditions at this particular site are analyzed. Also, the mechanical operation of the system, the reliability and maintainability of the different components, as well as the general behavior of the filter media after successive filtration and regeneration, are assessed.

COM-75-10743/3GA PC$3.25/MF$2.25
Wisconsin Univ., Madison. Center of Applied Sociology.
Age and the Journey to Work.
Working paper,
Frank Clements, and Gene F. Summers. Aug 73, 11p RID-73.13 EDA/OER-75-022
Grants EDA-OER-417-G-72-7, PHS-MH-19689
Prepared in cooperation with Pennsylvania State Univ., University Park. Dept. of Sociology.

Descriptors: *Employment, *Travel, *Age groups, Correlations, Travel time, Distance, Urban areas, Mobility, Steel plants, Statistical methods, Hypotheses, Automobiles, Recommendations.
Identifiers: *Journey to work characteristics, Travel distance, Inverse relationships.

An hypothesis suggesting an inverse association between age and distance traveled to work was tested by correlation analysis. The results indicated no support for the expected linear relationship between age and distance commuted. This finding runs counter to the well documented inverse relationship between age and other dimensions of geographic mobility. Several possible reasons for the failure of age to emerge as a predictor of distance traveled to work are suggested and are briefly discussed.

COM-75-10746/6GA PC$7.25/MF$2.25
Georgia Univ., Athens. Coll. of Business Administration.
Effects of Journey-to-Work Commuting on the Development of Low-Income Areas.
Research rept.,
Charles F. Floyd, A. Ray Grimes, Jr., H. R. Shiledar Baxi, C. Bruce Kavan, and Joy D. Shields. Feb 74, 214p EDA/OER-75-025
Sponsored in part by Economic Development Administration, Washington, D.C. Office of Economic Research.

Descriptors: *Economic development, *Rural areas, *Transportation, Regional planning, Population migrations, Employment, Statistical analysis, Counties, Travel patterns, Georgia, South Carolina.
Identifiers: Commuting, Journey to work characteristics.

The study is based on the relationship between commuting and the economic development of underdeveloped rural areas. An extensive survey was made of the literature on journey-to-work commuting, regional migration, and policies for regional economic development. Models to explain intercounty commuting were formulated and statistically estimated and these results are reported. Several empirical studies of commuting behavior in specific areas were undertaken in the states of Georgia and South Carolina. Insight was gained into many aspects of the journey-to-work commuting process and its relationship to area development. Findings, policy recommendations, and directions for future research are summarized.

COM-75-10765/6GA PC$4.75/MF$2.25
Harris (Frederic R.), Inc., New York.
Port Collection and Separation Facilities for Oily Wastes. Volume VI. Impact of Offshore Terminals on Contiguous Ports.
Report for 1 Sep 73-31 Jan 75,
Richard L. Forster, J. E. Moyer, and M. Lepeau. Mar 75, 89p* MA-GEN-970-75067
Contract MA-2-36202
See also Volume 5, COM-74-10012.

Descriptors: *Harbor facilities, *Offshore terminals, *Liquid waste disposal, *Oil pollution, Crude oil, Refineries, Petroleum products, Supertankers, Collection, Forecasting, Waste disposal, Petroleum transportation, Marine transportation, Construction, Pipelines, Surveys, Estimates.
Identifiers: *Oil pollution control, Bilge water, Ballast water, *Deepwater ports.

The impact of the energy crisis, embargoes and environmental concerns of transportation of crude oil and petroleum products to potential offshore receiving terminals is ascertained. As the proposed refinery construction programs are directly related to offshore terminal construction, the import of the various refinery construction programs on offshore terminals and the movement of produce by product tankers is also analyzed. The various ports on the three coasts are analyzed with respect to sizes of tankers that may be accommodated and a vessel mix is developed. From this mix and the forecast petroleum demand, tanker movement requirements are estimated. These estimates are used to develop four arrival matrices for 1980 and for 1985--for PAD I and PAD III. Three arrival matrices are developed for PAD V over the same period. From these matrices based on assumed enforcement of the 1973 IMCO Convention, the quantities of oily wastes likely to arrive at given ports on the three seacoasts are estimated.

JPRS-64946 PC$4.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Translations on Environmental Quality, No. 84.
9 Jun 75, 77p
Trans. from various journals.

Descriptors: *Environmental quality, Air pollution, Water pollution, Germany, Colombia, Ecuador, Peru, Venezuela, USSR, Translations.

Contents:
- East Germany-Discussion on Baltic Sea pollution;
- Colombia-Pollution endangers flora, fauna of Cartagena Bay;
- Peru-Nationalization without compensation urged for iron mine;
- Venezuela-Sanitation Institute Commission to fight river pollution;
- USSR-Basic principles, goals of USSR environmental policy;
- Sumskaya Oblast environmental pollution described;
- Hygienic problems of environmental protection of Siberia and Far East;
- Hygienic problems of forecasting the quality of water resources.

NTIS/PS-75/541/3GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Waste Processing and Pollution in the Chemical and Petrochemical Industries (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Kirk G. Werner, and Edward J. Lehmann. Jul 75, 217p*
Supersedes NTIS/PS-74/118.

Descriptors: *Petroleum refining, *Bibliographies, *Industrial waste treatment, *Chemical industry, *Solid waste disposal, Abstracts, Water pollution, Air pollution, Industrial wastes, Economic factors, Refineries.
Identifiers: *Water pollution control, Petrochemical industry, Emission factors, *Air pollution control, Air pollution abatement, Water pollution abatement.

This bibliography includes references discussing control processes, pollution effects, economic factors, emissions, and abatement strategies for the chemical and petrochemical industries. Air and water pollution and solid wastes are covered. (Contains 212 abstracts).

NTIS/PS-75/542/1GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Oil Spill Removal (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Mona F. Smith. Jul 75, 207p*
Supersedes COM-74-10951.

Descriptors: *Bibliographies, *Water pollution, *Oils, Skimmers, Booms(Equipment), Cleaning, Coalescing, Dispersing, Material separation, Absorption, Materials recovery, Flotation, Combustion, Test methods, Barriers, Ocean waves.
Identifiers: *Oil pollution removal, Oil spills, Oil water separators, Water pollution control.

The removal processes covered are oil water separators, skimmers, dispersants, adsorbents, flotation and combustion. Related studies on oil spreading, droplet entrainment, prototype removal systems, equipment and costs are also presented. Oil water separators designed only for tanker ballast water cleaning have not been included. (Contains 202 abstracts) See also NTIS/PS-75/152/9, Biodeterioration of Oil Spills.

NTIS/PS-75/544/7GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Urban Noise Pollution (A Bibliography with Abstracts).
Rept. for 1970-Jun 75,
Edward J. Lehmann. Jul 75, 84p*
Supersedes NTIS/PS-74/106. See also NTIS/PS-75/545.

Descriptors: *Bibliographies, *Noise pollution, *Urban planning, Attitude surveys, Urban transportation, Noise reduction, Community relations, Vehicular traffic, Traffic noise, Land use, Airports, Mathematical models, Environmental issues.

Aspects of noise in the urban environment are covered in this bibliography of Federally-sponsored research. The topics were chosen for their interest to urban planners and include citizen attitudes, transportation noise, and noise abatement techniques. (Contains 79 abstracts).

NTIS/PS-75/545/4GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Urban Air Pollution (A Bibliography with Abstracts).
Rept. for 1970-Jun 75,
Edward J. Lehmann. Jul 75, 177p*
Supersedes NTIS/PS-74/104. See also NTIS/PS-75/544.

Descriptors: *Bibliographies, *Urban planning, *Air pollution, *Urban transportation, Exhaust gases, Public health, Atmospheric models, Technology innovation, Government policies, Transportation planning, Economic factors, Law enforcement, Mathematical models, Computer technology.
Identifiers: *Air pollution abatement, Air quality maintenance.

Cited are reports on urban air pollution and its abatement. These studies were selected to be of general interest to urban planners in order to allow them to become aware of new abatement strategies and techniques. The majority of the studies cover various aspects of transportation emissions. Other topics include health standards, atmospheric models to aid in planning, law enforcement, abatement policies, and the effects of new modes of transportation. (Contains 172 abstracts).

NTIS/PS-75/550/4GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Tunnel Construction (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Guy E. Habercom, Jr. Jul 75, 185p*
Supersedes NTIS/PS-74/096.

Descriptors: *Bibliographies, *Tunnel construction, *Tunneling(Excavation), Tunneling machines, Tunnel linings, Cost analysis, Rock properties, Underground supporting, Abstracts.
Identifiers: Finite element analysis.

Unique tunneling methods, cost studies, tunnel support innovations, patents relative to tunneling machines, and finite element analyses of rock encountered in tunneling processes are included in these Government-sponsored research reports. (Contains 180 abstracts).

NTIS/PS-75/552/0GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Flood Control (A Bibliography with Abstracts).
Rept. for 1964-May 75,
Robena J. Brown. Jul 75, 263p*
Supersedes COM-74-11201.

Descriptors: *Flood control, *Bibliographies, Flood plains, Hydrology, Regional planning, Flood forecasting, Flood plain zoning, River basins, Urban areas, Mathematical models, Water pollution, Policies, Reservoirs.

Research studies are presented involving floods as related to control, forecasting, warning systems, urban planning, prevention, zoning, urbanization, and land use management. Flood control studies for specific towns and reports generated by the Army Engineers which deal with specific areas have been excluded. (Contains 258 abstracts).

NTIS/PS-75/553/8GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Breakwaters (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Robena J. Brown. Jul 75, 191p*

Descriptors: *Breakwaters, *Bibliographies, Design, Construction materials, Hydrodynamics, Maintenance, Floating bodies, Beach erosion, Harbors, Coastal topographic features, Ocean waves, Construction, Hydraulic structures, Marinas, Coastal engineering, Shore protection.
Identifiers: Floating breakwaters.

The bibliography is divided into two sections. Section 1 covers general studies on breakwaters which include design, construction materials, maintenance, and hydrodynamics. Section 2 is limited to studies of breakwaters for specific harbors, bays, or coastal regions. (Contains 186 abstracts).

NTIS/PS-75/558/7GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Water Rights and Water Law. Volume 2. 1974-Jun 75 (A Bibliography with Abstracts).
Rept. for 1974-Jun 75,
Guy E. Habercom, Jr. Jul 75, 104p*
Supersedes NTIS/PS-74/099. See also Volume 1, NTIS/PS-75/559.

Descriptors: *Bibliographies, *Water rights, *Water law, Water resources, Legislation, Law(Jurisprudence), Water management, Water quality, Water supply, Litigation, Abstracts.

Legal aspects of interstate and intrastate water rights, water quality, and water management are investigated in these Government-sponsored research reports. (Contains 99 abstracts).

NTIS/PS-75/559/5GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Water Rights and Water Law. Volume 1. 1964-1973 (A Bibliography with Abstracts).
Rept. for 1964-Nov 73,
Guy E. Habercom, Jr. Jul 75, 127p*
See also Volume 2, NTIS/PS-75/558.

Descriptors: *Bibliographies, *Water rights, *Water law, Water resources, Legislation, Law(Jurisprudence), Water management, Water quality, Water supply, Litigation, Abstracts.

Legal aspects of interstate and intrastate water rights, water quality, and water management are investigated in these Government-sponsored research reports. (Contains 122 abstracts). See also NTIS/PS-75/558, Water Rights and Water Law. Vol. 2. 1974-1975.

N75-22936/9GA PC$3.75/MF$2.25
Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.
Heat and Mass Transfer in the Environment.
D. P. Spalding. Dec 73, 34p HTS/73/56

Descriptors: *Convective heat transfer, *Environment pollution, *Mass transfer, *Thermal conductivity, Air pollution, Differential equations, Scale models, Thermal pollution, Turbulent flow, Water pollution.

For abstract, see STAR 1314

N75-22938/5GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
Application of Vascular Aquatic Plants for Pollution Removal, Energy and Food Production in a Biological System.
B. C. Wolverton, R. M. Barlow, and R. C. Mcdonald. 12 May 75, 17p NASA-TM-X-72726

Descriptors: *Pollution control, *Vegetation growth, *Waste disposal, *Water pollution, Energy sources, Food, Sewage, Tables (Data), Waste utilization.

For abstract, see STAR 1314

PB-231 300-14/GA PC$25.00/MF$25.00
Environmental Protection Agency, Washington, D.C. Grants Administration Div.
Wastewater Treatment Construction Grants Data Base: Public Law 92-500 Project Records New Projects Funded During April 1975. Grants Assistance Program.
1 Jul 75, 151p* EPA/GAD/2-75-006
Paper copy available on subscription $100.00/year domestic, $125.00/year foreign.

Descriptors: *Sewage treatment, *Industrial waste treatment, *Water pollution control, *Grants, Industrial plants, Construction.
Identifiers: *Sewage treatment plants.

Awards for wastewater treatment facilities under Public Law 92-500 are listed on a monthly basis. The publication provides the essential information on all awards made during the month listed. The awards are sorted by state and the information provided is applicant identification, grant number, grant title, award date, award amount, grant step such as one planning, two design, three-construction, description of facility to be constructed and other data.

PB-241 743/4GA PC$4.25/MF$2.25
Texas Highway Dept., Austin. Div. of Automation.
A Portable Automated Data Acquisition System for Material Haul Documentation.
Departmental research rept. (Final),
Roger L. Merrell. Feb 75, 70p 1-19-74-179-1F

Descriptors: *Cargo transportation, *Weight measurement, *Highway transportation, *Data acquisition, Input output devices(Computers), Portable equipment, Computer programs, Accountability, FORTRAN.
Identifiers: *Minicomputers, DOT/4IZ/IA, FORTRAN 4 programming language.

Existing manual procedures for material haul tickets when payments are by weight involve a considerable amount of manual checking, arithmetic calculations and ticket accountability. The availability of small mini-computers and appropriate input and output devices allowed for the development of a portable, automated data acquisition system which is capable of capturing the data at its source. All of the functions of ticket generation, ticket accountability, material summary reports and checking are accomplished with the system. An additional important feature is that the hardware is small enough to be transported from project to project. Due to its interactive mode of operation, a technician can be trained to use the system in approximately one hour. While cost effectiveness of operating this system depends on the size of the hauling operation and the amount of checking required, the overall benefits of the system are derived from accurate, flexible documentation and the release of skilled technicians for other work. Since the data is captured at its source in a computer environment, remote transmission to a central material control system would minimize subsequent material accounting procedures involved in contractor payments and materials testing.

PB-241 884/6GA PC$6.25/MF$2.25
Black, Crow and Eidsness, Inc., Montgomery, Ala.
Plant Scale Studies of the Magnesium Carbonate Water Treatment Process.
Final rept.,
A. P. Black, and C. G. Thompson. Sep 74, 151p EPA/660/2-75-006

Descriptors: *Water treatment, *Magnesium carbonates, *Coagulation, Alums, Materials recovery, Sludge disposal, Pilot plants, Reclamation, Flotation, Carbon dioxide, Calcium oxides, Cost estimates, Florida, Alabama.
Identifiers: Waste recycling, Montgomery(Alabama), Melbourne(Florida).

The magnesium carbonate process of water treatment has replaced alum in a portion of two water plants in full scale studies conducted over the past two and one-half years. This new water treatment technology was compared to the presently used alum process in parallel treatment using identical units in Montgomery, Alabama and Melbourne, Florida. All water is recycled within the process along with the three basic water treatment chemicals - lime, magnesium bicarbonate, and carbon dioxide. Other advantages found were increased floc settling rates, simplicity of operation and control, reduced costs when sludge treatment and disposal costs are considered, and more complete disinfection. In Melbourne's case, considerable energy would be conserved by on-site lime recovery.

PB-241 905/9GA PC$10.25/MF$2.25
Environmental Protection Agency, Washington, D.C. Effluent Guidelines Div.
Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Major Organic Products Segment of the Organic Chemicals Manufacturing Point Source Category.
Final rept.,
John Nardella. Apr 74, 378p* EPA/440/1-74-009-a
See also report dated Mar 74, PB-238 611.
Paper copy also available from GPO.

Descriptors: *Chemical industry, *Organic compounds, *Industrial waste treatment, Pigments, Synthesis(Chemistry), Manufacturing, Dyes, Coal tax, Operating costs, Capitalized costs, Performance standards, Water pollution, Cost estimates, Process charting, Industrial wastes, Economic analysis.
Identifiers: *Water pollution control, *Water pollution standards, *Best technology, SIC 2815, SIC 2818.

A study of the major organic chemicals segment of the organic chemicals manufacturing industry was conducted. The purpose of this study was to establish effluent limitations guidelines for existing point source discharges and standards of performances and pretreatment standards for new sources. 41 major product-process segments of the industry were investigated. These product-processes and others significant segments to be covered in the second phase of this study were categorized into four subcategories based on process technology as related to process water requirements. The industry is not readily defined in terms of the Standard Industrial Classification (SIC) system. However, commodities included under SIC 2815 (Cyclic Intermediates and Crudes) and SIC 2818 (Industrial Organic Chemicals) provide a reasonable approximation and have been used to define the limitations of the industry for the current study. Primary petrochemical processing, plastics, fibers, agricultural chemicals, pesticides, detergents, paints, and pharmaceuticals have been excluded. Processes, wastes, control technology, and costs are discussed.

PB-241 916/6GA PC$7.50/MF$2.25
Environmental Protection Agency, Washington, D.C. Effluent Guidelines Div.
Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Fabricated and Reclaimed Rubber Segment of the Rubber Processing Point Source Category.
Final rept. on Phase 2, Group 1,
Richard J. Kinch. Dec 74, 243p* EPA-440/1-74-030-a
Paper copy also available from GPO.

Descriptors: *Rubber industry, *Industrial waste treatment, Digestion(Decomposition), Moldings, Reclamation, Manufacturing, Latex, Extruding, Molding techniques, Fabrication, Operating costs, Capitalized costs, Performance standards, Water pollution, Cost estimates, Process charting, Industrial wastes, Economic analysis.
Identifiers: *Water pollution control, *Water pollution standards, *Best technology, SIC 3021, SIC 3031, SIC 3041, SIC 3069, SIC 3293, SIC 7534.

This document presents the findings of an extensive study of the rubber processing industry to develop effluent limitations guidelines, Federal standards of performance, and pretreatment standards for the industry. The development of data and recommendations in the document relate to the overall rubber processing industry which is divided into four major segments: general molded, extruded and fabricated rubber products, wet digester rubber reclaiming, pan (heater), mechanical and dry digestion rubber reclaiming and latex-based products. Supportive data and the rationale for development of the effluent limitations guidelines and standards of performance are contained in this report. Wastes, control technology, and costs are discussed.

PB-241 947/1GA PC$5.25/MF$2.25
Iowa State Water Resources Research Inst., Ames.
Flood Plain Management and Implementation Strategies for FPM Programs,
Merwin D. Dougal, Ronald L. Rossmiller, and T. Al Austin. Dec 74, 116p ISWRRI-67 W75-07890, OWRT-X-135(9071)(2)
Contract DI-14-31-0001-9079
Prepared in cooperation with Wisconsin Univ., Madison. Water Resources Center, Nebraska Univ., Lincoln. Water Resources Research Inst., and Missouri River Basin Water Inst. Consortium.

Descriptors: *Flood plains, *Flood plain zoning, *Research needs, Management, Land use, Economic impacts, Social effect, Water law, Policies, Regulations, Flood control, Institutional implications, Iowa, Illinois.

Research needs in the field of flood plain management (FPM), particularly as directed to implementation strategies for FPM programs, are identified and discussed. Results are presented of a midwest regional workshop in

which representatives of state and Federal agencies working in water resources participated with university faculty in evaluating problem areas and the need for additional knowledge. A multidisciplinary approach was used to concentrate on four broad areas: (1) Land use and policy phase, (2) technical and related engineering phase; (3) the social-economic relationships and associated problem areas; (4) the legal and institutional areas and remaining obstacles to acceptance and implementation of FPM programs. A summary and priority assignment is presented for the major problem areas and identified research needs. Included are key comments from participants and comprehensive rules, procedures, and regulations as proposed for two midwestern states, Iowa and Illinois.

PB-241 991/9GA PC$7.25/MF$2.25
National Bureau of Standards, Washington, D.C.
Pollutant Analysis Cost Survey.
Final rept. Jun 72-Jun 74,
Bernard Greifer, and John K. Taylor. Dec 74, 211p* EPA-650/2-74-125

Descriptors: *Air pollution, *Water pollution, *Chemical analysis, *Trace elements, Industrial wastes, Cost estimates, Fly ash, Coal, Petroleum, Spectrochemical analysis, Neutron activation analysis, Mass spectroscopy, X ray analysis, X ray fluorescence, Spectroscopic analysis, Polarographic analysis, Potentiometric analysis, Particles.
Identifiers: *Pollutant identification, Water pollution detection, Air pollution detection, Atomic absorption spectroscopy, Air pollution control, Standard reference materials, Water analysis, Gas analysis.

The report summarizes various approaches to the chemical analysis of heavy industry process materials and effluents for trace element constituents that might contribute to environmental pollution. It assesses the capabilities and costs of nuclear methods, spark source mass spectrometry, x-ray fluorescence and electron and ion microprobe spectrometry, atomic absorption spectrometry, absorption spectrophotometry, atomic emission spectroscopy, voltammetry (polarography) and potentiometry (ion-selective electrodes) for determining traces (less than 100 ppm) of He, Be, Cd, As, V, Mn, Ni, Sb, Cr, Zn, Cu, Pb, Se, B, F, Li, Ag, Sn, Fe, Sr, Na, K, Ca, Si, Mg, U, and Th in such matrices as fly ash, coal, oil, ores, minerals, metals, alloys, organometallics, incinerator particulates, slurry streams, and feeds to and from sedimentation processes. The report includes a selected bibliography of the current literature, and a review of the Standard Reference Materials available for environmental analysis.

PB-242 005/7GA PC$4.25/MF$2.25
Engineering-Science, Inc., McLean, Va.
Testing of a Molecular Sieve Used to Control Mercury Emission from a Chlor-Alkali Plant. Volume I.
Environmental protection technology series
(Final) Sep 74-Jan 75,
John T. Chehaske, and John R. Cline. Mar 75, 62p EPA/650/2-75-026A
Contract EPA-68-02-1406
Paper copy also available in set of 2 reports as PB-242 004-SET, $11.00.

Descriptors: *Air pollution control equipment, *Mercury(Metal), *Chemical industry, *Absorbers(Materials), Performance tests, Design, Sources, Hydrogen, Sampling.
Identifiers: Chlor alkali plants, *Molecular sieves.

In Part 1 of the report performance testing for mercury emission control was conducted by Engineering-Science, Inc. on the Union Carbide PuraSiv Hg unit currently controlling mercury emissions from the by-product hydrogen stream of the mercury-cell chlor-alkali production facility of Sobin Chlor-Alkali in Orrington, Maine. Simultaneous samplings of adsorber inlet and outlet streams were performed during five consecutive 24-hour adsorption cycles, eight sampling runs per cycle, in accordance with a modified version of EPA Reference Method 102. If operated at design capacity, the estimate outlet mercury concentrations from the PuraSiv Hg unit would average 2.0 micrograms/cu Nm throughout each adsorption cycle, representing a 99.9% collection efficiency.

PB-242 006/5GA PC$7.50/MF$2.25
Engineering-Science, Inc., McLean, Va.
Testing of a Molecular Sieve Used to Control Mercury Emission from a Chlor-Alkali Plant, Volume II. Appendices.
Environmental protection technology series
(Final) Sep 74-Jan 75,
John T. Chehaske, and John R. Cline. Mar 75, 229p EPA/650/2-75-026B
Contract EPA-68-02-1406
Paper copy also available in set of 2 reports as PB-242 004-SET, $11.00.

Descriptors: *Air pollution control equipment, *Mercury(Metal), *Chemical industry, *Absorbers(Materials), Performance tests, Sampling, Instrumentation, Measuring instruments, Tables(Data), Computer programs, Gas analysis.
Identifiers: *Air pollution detection, Chlor alkali plants, Molecular sieves.

As more and more emission standards are enacted, control agencies will be faced with the evaluation of stack test data. A mass emission rate or concentration will be either reasonable, high, or low, and the evaluator is faced with the task of determining which is the case. Part 2 presents a method using specific calculations to determine whether proper sampling conditions (isokinetic for particulates) were actually attained. By calculating the mass emission rate by two methods - (1) by the ratio of areas and (2) by the concentration basis, the ratio of the results yields the apparent average proportion of isokinetic conditions.

PB-242 085/9GA PC$7.25/MF$2.25
National Academy of Sciences, Washington, D.C. Committee on Motor Vehicle Emissions.
Report by the Committee on Motor Vehicle Emissions.
Final rept.
Nov 74, 203p*
Contract EPA-68-01-0402

Descriptors: *Air pollution abatement, *Automobiles, *Crankcase fumes, *Spark ignition engines, Automobile engines, Automotive fuels, Combustion products, Internal combustion engines, Revisions, Performance evaluation, Nitrogen oxides, Hydrocarbons, Cost estimates, Carbon monoxide.
Identifiers: *Technology assessment.

An evaluation was made of the technological feasibility, cost and fuel use associated with meeting various light-duty motor vehicle emissions standards for nitrogen oxides, hydrocarbons, and carbon monoxide. Emissions control of conventional automobile engines and alternative engines for automobiles are considered. Costs of emissions control, manufacturing constraints, and field performance and maintenance are analyzed. Various automotive fuels for automobiles and test methods and procedures for emissions and fuel economy are also considered.

PB-242 089/1GA PC$5.25/MF$2.25
City-County Planning Board, Winston-Salem, N.C.
Agricultural Zoning, Proposed R-9 Acreage Zoning and Supplementary Methods for Guiding Development Into an Urban Services District. A Report to the Forsyth County Commissioners and to the County's Municipalities.
Final rept.
3 Apr 75, 123p WSCCPB-75/1

Descriptors: *Regional planning, *Land use zoning, Agriculture, Boundaries, Legislation, Natural resources, Land development, Public utilities, Recommendations, Conservation, North Carolina.
Identifiers: Forsyth County(North Carolina).

The report describes and evaluates for local applicability growth management techniques including agricultural districting, acreage zoning, planning and persuasion, land conservation incentives, land development incentives, and governmental controls. The purpose of the report was to present the broadest possible range of growth management techniques to produce a package suitable for local implementation. The report is intended to facilitate governing body deliberations by including the rationale for establishing an Urban Services District and the actions needed for implementation in a single document.

PB-242 108/9GA PC$7.00/MF$2.25
Washington Univ., Seattle. Coll. of Engineering.
Engineering Uses of EROS.
Final rept.,
J. E. Colcord, and Hans Bernath. Sep 74, 180p
USGS-LI-75/001
Contract DI-14-08-0001-12865

Descriptors: *Remote sensing, *Engineering geology, *Photointerpretation, Photogrammetry, Scientific satellites, Instrumentation, Geologic investigations, Hydrographic surveys, Hydrology, Mapping, Flood control, Drainage, Watersheds, Snow line, Snow cover, Snowmelt, Vegetation, Land use, Planning, Site surveys, Washington(State).

This summation of research directed to engineering uses of EROS considers: instrumentation; predicton of ground reflectance from image measurement; physical accuracy of scene geometry; application of ERTS and multispectral imagery to water/land boundary and runoff problems; application of ERTS imagery to geological enineering and considerations of major siting problems; and scene changes with time and other engineering data.

PB-242 126/1GA PC$8.50/MF$2.25
Kenosha, Wis.
Biological Treatment of Combined Sewer Overflow at Kenosha, Wisconsin.
Final rept. Sep 69-Nov 73,
O. Fred Nelson, Robert W. Agnew, Charles A. Hansen, Michale J. Clark, and William H. Richardson. Apr 75, 259p EPA/670/2-75-019
Prepared in cooperation with Envirex, Inc., Milwaukee, Wis., and Alvord, Burdick and Howson, Chicago, Ill.

Descriptors: *Sewage treatment, *Combined sewers, *Overflows, Activated sludge process, Design, Construction, Performance evaluation, Surface water runoff, Automatic control equipment, Stabilization, Flocculating, Pumping, Settling, Clarification, Feasibility, Operating costs, Wisconsin.
Identifiers: Kenosha(Wisconsin).

The report describes the design, construction, operation and two-year evaluation of a biological process used for the treatment of potential combined sewer overflow. A 75,700 cu m/day (20 mgd) modified contact stabilization process was constructed on the grounds of an existing 87,055 cu m/day (23 mgd) conventional activated sludge plant at a total cost of 1.1 million dollars. The demonstration system consisted of

pumping facilities, the conversion of an unused flocculation basin into a grit basin, construction of a contact tank and stabilization tank, installation of a final clarifier and all associated yard piping and automatic control equipment. The demonstration system's raw sewage pump and clarifier were used by the dry weather plant when the demonstration system was not in use.

PB-242 171/7GA PC$3.75/MF$2.25
Minnesota Dept. of Highways, St. Paul. Office of Research Coordination.
Materials, Research and Standards, Implementing Research Findings: Sawing Joints to Control Cracking in Flexible Pavements.
Special study (Progress rept.),
R. M. Morchinek. 1974, 36p MN-HW-5-180-74-7, SS-315

Descriptors: *Flexible pavements, *Cutting, *Control joints, Cracks, Crack propagation, Sealing compounds, Joint sealers, Minnesota.
Identifiers: *Sawed joints, DOT/4CZ/CA, DOT/4BZ/BB.

Transverse joints were sawed in a deep-strength (12 inch) flexible pavement, which is over a granular subgrade, prior to the opening of the roadway to traffic. This research project was located on the two southbound lanes of Interstate 35 near Stacy. Each of the three test sections is approximately 500 feet long. Joints were sawed at 40, 60, and 100-foot intervvals for a total of 30 joints. Two 700-foot control sections, where no joints were sawed, were left between the sawed sections for comparison purposes. After 4-1/2 years or 5 winters of service almost complete crack arresting was accomplished in the test sections where joints were sawed at 40 and 60-foot intervals. A few cracks had formed in the test section where joints were sawed at 100-foot intervals. In contrast numerous cracks had developed in the control sections.

PB-242 181/6GA PC$7.00/MF$2.25
Sperry Urban Science Center, Washington, D.C.
Inter-Plan Communication and Motivation Study.
Final rept.,
Thomas E. Garrigan. Nov 73, 196p PUB-GL-2000-1047 NSF/RA/R-73/033
Grant NSF-C799

Descriptors: *Public works projects, *Technology innovation, *Private investments, Surveys, Constraints, Factor analysis, Problem solving, Attitudes, Florida, Leadership.
Identifiers: Nonparticipation.

This is the final report of a six-month study conducted in the Tampa Bay Region and the State Capital of Florida which investigated potential factors which diminished the success of innovative public programs, and which inhibited private investment in the development of solutions to public sector problems. Five major public programs were studied and discussed with over 50 key private and public decision-makers. The Steering Committee in charge of the investigation concluded that innovative public programs and the degree of private sector participation in them are adversely affected by several lacks which are discussed.

PB-242 226/9GA PC$4.75/MF$2.25
Maryland Univ., College Park. Dept. of Mechanical Engineering.
Investigation of Pre-Splitting and Smooth Blasting Techniques in Construction Blasting.
Rept. for 1 Feb-15 Dec 74,
A. Ladegaard-Pedersen, W. L. Fourney, and J. W. Dally. Dec 74, 93p NSF/RA/T-75-015
Grant NSF-GI-39320

Descriptors: *Underground explosions, *Boreholes, *Blasting, Face preparation(Mining), Crack propagation, Stress concentration, Stress waves, Excavation.
Identifiers: *Rock presplitting, *Smooth blasting.

The experiments described in this report were directed toward improving controlled crack growth from a borehole. This controlled growth is of the nature which would be used in either a pre-splitting or smooth blasting operation. The techniques studied involved the use of stress concentrations to promote crack initiation at preselected locations on the circumference of the borehole. The use of dummy holes and precut notches was investigated in the early phases of the study. In the later stages, the investigation concentrated on techniques of designing a charge holder so that the detonation produced a stress concentration on the surface of the borehole. The design of the charge holder promoted crack growth in preselected directions while shielding other regions from cracking damage. All tests were conducted with brittle polymeric models and used high speed photography to examine the initiation and propagation of cracks and interactions of the stress waves and these moving crack fronts.

PB-242 247/5GA PC$7.50/MF$2.25
Aerospace Corp., El Segundo, Calif. Urban Programs Div.
Medium Duty Vehicle Emission Control Cost Effectiveness Comparisons. Volume II. Technical Discussion,
M. G. Hinton, J. Meltzer, T. Iura, J. A. Drake, and L. Forrest. Jan 74, 237p* ATR-74(7327)-1-Vol-2 EPA/460/3-74-004-b
Contract EPA-68-01-0417
Paper copy also available in set of 2 reports as PB-242 245-SET, PC$11.00.

Descriptors: *Air pollution control equipment, Transportation management, Exhaust emissions, Electric power plants, Cost estimates, Comparison, Cost effectiveness, Automobiles, Trucks, Nitrogen oxides, Hydrocarbons, Carbon monoxide, Capitalized costs, Operating costs.
Identifiers: *Air pollution control, Emission inventories, Light duty vehicles, Heavy duty vehicles, *Medium duty vehicles, Fuel consumption.

In Volume II, the light-duty vehicles (LDVs--under 6,000 lb GVW) and medium-duty vehicles (MDVs) selected to form the basis of cost factor comparisons are characterized and delineated. The specific emission control systems used in LDV and MDV cost calculations, the characteristics or baseline emission levels prior to incorporation of emission control systems, and the lifetime costs attributable to emission control. A comparison and discussion of LDV and MDV cost factors (expressed as dollars expended per ton of pollutant removed) as a function of emission control system type and as a function of percent reduction in emission rate are summarized. The heavy-duty vehicle (HDV--over 14,000-lb GVW) cases examined are summarized. A summary overview of emission control cost factors associated with power plants and other stationary sources is given. A review of numerous transportation planning studies for selected air quality control regions (AQCRs), with emphasis on vehicle class distribution (LDV, MDV, and HDV) and annual mileage contributions is presented. Emission inventories are included for LDVs MDVs, and HDVs for the New York City, Los Angeles, and Phoenix/Tucson AQCRs.

PB-242 274/9GA PC$3.25/MF$2.25
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
The Torsional Response of a Suspension Bridge Stiffening Truss Model to Turbulence and to an Upstream Obstacle.
Partial rept. Oct 72-Dec 74,
T. A. Reinhold, H. W. Tieleman, and F. J. Maher. Dec 74, 22p VPI-E-74-28
Grant NSF-GK-35801

Descriptors: *Suspension bridges, *Trusses, *Aerodynamic loads, Turbulence, Turbulent flow, Damping, Degrees of freedom, Wind tunnel models.
Identifiers: Single degree of freedom.

A 1:64 scale section model of a recently constructed suspension bridge was tested in smooth flow and turbulent flow with and without an upstream 'obstacle'. Testing was limited to determination of the aerodynamic damping on a model confined to single-degree of freedom torsional motion. The turbulent atmosphere was generated by use of a uniform grid at the test section entrance. The upstream 'obstacle' selected was an almost exact 1:64 replica of a cable-stayed bridge that was basically a flat plate on a narrower box.

PB-242 279/8GA PC$5.75/MF$2.25
Clemson Univ., S.C. Water Resources Research Inst.
Effects of Price Change Upon the Domestic Use of Water Over Time.
Completion rept.,
Robert M. Pope, Jr, James M. Stepp, and John S. Lytle. Mar 75, 136p WRRI-56 W75-08355, OWRT-B-032-SC(3)
Contract DI-14-31-0001-3644

Descriptors: *Water consumption, *Price changes, *Consumer behavior, Economic surveys, Mail canvasses, Demand(Economics), Rates(Costs), South Carolina, Municipalities, Household relationships, Public relations, Statistical samples, Records.
Identifiers: Monthly summaries, Temporal analysis.

The research is based upon mail-survey data and monthly water-use records for a randomized sample of 1464 households in four South Carolina municipalities which increased the price of water during the period 1966-1969. In each case the data were for 12 months before the price change and 24 months thereafter. It was hypothesized that the residential water-use effect of a price increase (i.e. elasticity of demand) would tend to decrease over time as people become accustomed to paying the higher price, and it was hoped that a turning point could be identified. Non-comparability of monthly water-use records precluded meaningful analysis of monthly differences in water use, but demand elasticity coefficients computer on an annual basis for the first and second years following the price increases support the hypothesis.

PB-242 280/6GA PC$5.25/MF$2.25
Washington State Water Research Center, Pullman.
Regional Problem Analysis in the Pacific Northwest: Part A - Instream Flow Needs. Part B - Basalt Groundwater Aquifers. Part C - Wild and Scenic Rivers.
Completion rept.,
Harvey R. Doerksen. Mar 75, 121p W75-08356, OWRT-B-056-WASH(1)

Descriptors: *Regional planning, *Water resources, *Pacific Northwest Region(United States), Water consumption, Aquifers, Basalt, Rivers, Boundaries, Research needs, Alaska, Idaho, Oregon, Washington(State).
Identifiers: Wild rivers.

A four-state project engaged the states of Alaska, Idaho, Oregon, and Washington to jointly undertake a regional problem-research analysis of water resources problems in the Pacific Northwest. Activities are summarized of the three contiguous states to identify, analyze the structure, evaluate alternatives for solution,

and assess the knowledge and understanding required for the resolution of three water-related problems of the Pacific Northwest. The three regional problems analyzed were (1) Instream flow needs methodology to determine how much water is required for various water uses; (2) study of the basalt aquifers in Washington, Oregon, and Idaho to determine the extent, boundaries, capacity, and potential uses; (3) the impact of designation of Wild and Scenic rivers on other values, including social, economic, and political values, and upon alternative uses of water and adjacent land resources.

PB-242 282/2GA PC$3.75/MF$2.25
Midwest Research Inst., Kansas City, Mo.
Emission Factor Development for the Feed and Grain Industry.
Final rept.,
P. G. Gorman, M. Schrag, and E. Trompeter.
Oct 74, 50p EPA/450/3-75-054
Contract EPA-68-02-1324

Descriptors: *Air pollution, *Grain elevators, *Flour mills, Feeding stuffs, Particles, Dehydrators, Factor analysis, Industries, Crop driers, Drying apparatus.
Identifiers: *Emission factors, Alfalfa, *Feed and grain industry.

The report contains an evaluation of available data used to develop emission factors for alfalfa dehydration plants, grain elevators and other feed and grain operations.

PB-242 287/1GA PC$7.00/MF$2.25
Enviro Control, Inc., Rockville, Md.
Water Pollution Investigation: Maumee River and Toledo Area.
Final rept.,
J. Horowitz, J. R. Adams, and L. A. Bazel. Jan 75, 183p EPA/905/9-74-018
Contract EPA-68-01-1567
Prepared in cooperation with Toledo Metropolitan Area Council of Governments, Ohio.

Descriptors: *Water pollution, *Maumee River, Surveys, Inorganic phosphates, Inorganic nitrates, Suspended sediments, Water analysis, Bacteria, Water quality, Oxygen, Temperature measurement, Biochemical oxygen demand, Drainage, Nutrients, Sources, Tables(Data), Ohio.
Identifiers: *Water quality data, Dissolved oxygen, Toledo(Ohio).

The combination of long retention times in the Maumee estuary, large rural sources of landwash, sludge beds below river mile six, poor sewerage, a large cooling-water discharge from the Acme powerplant, and the erratic performance of Toledo's sewage treatment plant has degraded the lower Maumee River; several nearby streams are heavily polluted. These waters are loaded with solids, they are enriched with nutrients and organics, and they violate Ohio's oxygen and bacterial standards. Even if Toledo were to be wiped off the map, these conditions would not entirely disappear, nor would many of them be much changed.

PB-242 289/7GA PC$7.00/MF$2.25
Argonne National Lab., Ill. Energy and Environmental Systems Div.
An Evaluation of Strategies for Airport Air Pollution Control.
Final rept.,
R. R. Cirillo, J. F. Tschanz, and J. E. Camaioni. Jan 75, 182p* EPA/450/3-75-052

Descriptors: *Air pollution, *Airports, Mathematical models, Field tests, Evaluation, Statistical dispersion, Exhaust gases, Taxiing, Towing, Carbon monoxide, Hydrocarbons, Atmospheric diffusion, Nitrogen oxides, Regional planning, Georgia.
Identifiers: *Aircraft ground operations, *Atlanta(Georgia), *Air pollution abatement, Air quality maintenance.

The report is the second phase of a program to develop an airport air pollution impact methodology, involving modifications to aircraft ground operations to achieve emission reductions. The airport planning process was investigated to determine the points at which alternate strategies might be implemented. The principal evaluative tool was a Guassian plume description of pollutant dispersion. The five control strategies for aircraft studied were: (1) engine shutdown during taxi, (2) towing aircraft between runways and terminal gates, (3) capacity control, (4) fleet mix control and (5) engine emission standards.

PB-242 290/5GA PC$7.00/MF$2.25
Florida Univ., Gainesville. Dept. of Environmental Engineering Sciences.
Urban Stormwater Management Modeling and Decision-Making.
Final rept.,
James P. Heaney, Wayne C. Huber, Hasan Sheikh, Miguel A. Medina, and J. Robert Doyle. May 75, 198p* EPA/670/2-75-022
Grant EPA-S-802219
See also report dated Dec 74, PB-240 687.
Prepared in cooperation with Lancaster City, Pa.

Descriptors: *Water pollution control, *Sewage treatment, *Storm sewers, *Urban planning, Decision making, Surface water runoff, Flood control, Drainage, Water storage, Combined sewers, Hydrology, Optimization, Mathematical models, Cost effectiveness, Design standards, Streets, Control equipment.
Identifiers: *Storm water runoff, *Urban hydrology.

The purposes of this study were to test, refine and augment the capabilities of the EPA Storm Water Management Model (SWMM), and to develop decision-making capabilities for use in the study of urban stormwater runoff problems. A sediment prediction capability has been incorporated directly into the SWMM. Detailed testing was conducted in Lancaster, Pennsylvania to demonstrate the ability of the SWMM to describe the relatively complex phenomena occurring in an urban catchment. A systematic procedure is presented for examining the stormwater management problem in the broader context of urban water resources management. Related standards for flood control and drainage, street and parking lot design, etc., are reviewed and suggestions presented regarding modifications in practices which would ameliorate stormwater problems. An optimization procedure is described which addresses the related problems of finding efficient and equitable control strategies. Also, the use of the SWMM for preliminary hydraulic design of sewer systems is described.

PB-242 292/1GA PC$5.25/MF$2.25
Department of Transportation, Washington, D.C. Office of Univ. Research.
Regulations and Transportation. Report of the Workshop on National Transportation Problems (3rd) on 11-12 February 1975.
12 Feb 75, 108p DOT-TST-75/79

Descriptors: *Transportation, *Regulations, *Meetings, Transportation problems, Prices, Aviation safety, Security systems, Traffic safety, Transportation management, Energy conservation, Automobiles.
Identifiers: DOT/5A, DOT/2, Boating accidents, Ship accidents, Railroad accidents.

The workshop is one of a continuing series to develop information useful to the Department of Transportation policymakers through interaction of principal investigators in universities under contract to the Department and the members of the Department responsible for programs affected by government regulations. Four sessions were held chaired by DOT Officials and addressed by policy (Secretarial level) officials: Ratesetting processes affecting costs and price; Regulations set by DOT: Safety and security; Regulation research and evaluation; Regulation and data requirements. The proceedings of the workshops on these subjects constitute the first part of the report. Part II are the formal presentation made by various policy officials as resource papers for the workshops. The agenda of the workshop and the attendance list constitute the appendix of the report.

PB-242 297/0GA PC$3.75/MF$2.25
American Society of Civil Engineers, New York.
Effects of Urbanization on Water Quality.
Urban water resources research program,
Robert P. Shubinski, and Steven N. Nelson. Mar 75, 44p TM-26 W75-08351, OWRT-C-F045(4224)(2)
Contract DI-14-31-0001-4224
Prepared in cooperation with Water Resources Engineers, Inc., Springfield, Va., and DeKalb County Planning Dept., Decatur, Ga.

Descriptors: *Urban planning, *Land use, *Water pollution, Water quality, Drainage, Surface water runoff, Construction, Urbanization, Storms, Overflows, Combined sewers, Agricultural wastes, Industries, Residential buildings, Flood plains.

Land use and water quality relationships are outlined, including the relations between source and type of water pollution. Effects of land use on point discharges are enumerated, for residential, commercial, industrial and power generation land uses. A parallel evaluation is made of nonpoint discharges from urban storm runoff, agricultural drainage, construction runoff and resource extraction. Also the effects of land use are categorized within environmentally sensitive areas, such as floodplains and shorelines, aquifer recharge areas and estuaries and wetlands.

PB-242 298/8GA PC$9.50/MF$2.25
Michigan State Univ., East Lansing. Inst. of Water Research.
Watershed Organizations - Impact on Water Quality Management: An Analysis of Selected Michigan Watershed Councils.
Completion rept. 1 Jul 73-30 Sep 74,
Edward Hood, and Eckhart Dersch. May 75, 344p W75-08354, OWRT-A-069-MICH(1)
Contract DI-14-31-0001-4022

Descriptors: *Water quality, *Organizations, *Water management, Watersheds, State government, Legislation, Local government, Institutional implications, Constraints, Effectiveness, Questionnaires, Recommendations, Michigan.

Utilizing a case study approach, eight Michigan Watershed Councils were evaluated to determine the degree to which they could have an effective impact on planning for water quality management within constraints imposed by existing state legislation. Methods chosen to measure the extent and type of this impact included first the development of a weighted index of effectiveness. Models established from this index were tested against organization operation, as revealed through council records and activities and through results of questionnaires and interviews of key individuals, representatives and government officials associated with the individual councils.

PB-242 300/2GA PC$6.25/MF$2.25
Rocketdyne, Canoga Park, Calif.

Urban Water Development and Management in Arid Environments. Volume I: Completion Report,
Walter Unterberg, Anthony L. Midnling, John A. Dracup, Jonathan W. Bulkey, and Gary L. Widman. 31 Mar 75, 169p* R-9625-1 W75-08352, OWRT-C-1734(3395)(1)
Contracts DI-14-31-0001-3393, DI-14-31-0001-9000
See also PB-242 301.

Descriptors: *Water management, *Urban planning, *Arid land, *Semiarid land, Water resources, Decision making, Mathematical models, Political objectives, Water law, Interviews, Management games, Gaming models, Computers programming, Arizona, California, Nevada, New Mexico, Utah.
Identifiers: Las Vegas(Nevada), Oxnard(California), Salt Lake City(Utah), San Bernardino(California), San Diego(California), Tucson(Arizona), Carson City(Nevada), Goleta County(California), Alamogordo(New Mexico).

In Phase I (Project C-1734), an appraisal was made of urban water development and management in arid and semiarid environments by means of case studies of key historic water decisions in six cities. In each city alternative solutions to water resource problems and organizations and factors that affected the decisions were identified and researched through interviews. These data were inputs to a Political Interaction Simulation computer program (PISP), which was used to model the decision-making processes. The results of the case studies led to guidelines that were applied during Phase II in three arid and semiarid cities having to make key water decisions in the near future. This included the use of PISP as a predictive decision-making tool, validated by election results, and the development of a Gaming Simulation tool entitled 'The Water Game', as a strategic arid urban water resources planning tool. Portions of this document are not fully legible.

PB-242 301/0GA PC$5.75/MF$2.25
Rocketdyne, Canoga Park, Calif.
Urban Water Development and Management in Arid Environments. Volume II: The Water Game--Gaming Simulation for Urban Water Resources Planning,
Walter Unterberg, John A. Dracup, William J. Trott, and Michael E. Mulvihill. 31 Mar 75, 145p* R-9625-2 W75-08353, OWRT-C-1734(3395)(1)
Contracts DI-14-31-0001-3393, DI-14-31-0001-9000
See also Volume 1, PB-242 300.

Descriptors: *Water management, *Urban planning, *Arid land, *Semiarid land, Water resources, Decision making, Mathematical models, Political objectives, Water law, Computerized simulation, FORTRAN, Management games, Computer programs, Arizona, California, Nevada, New Mexico, Utah.
Identifiers: Las Vegas(Nevada), Oxnard(California), Salt Lake City(Utah), San Bernardino(California), San Diego(California), Tucson(Arizona), Carson City(Nevada), Goleta County(California), Alamogordo(New Mexico), FORTRAN 4 programming language.

Volume 2 deals with the generation and practice of The Water Game, a Gaming Simulation for Urban Water Resources Planning. Part 1, 'Game Description' deals with the development and detailed features of The Water Game. It includes the documentation and listing of the digital computer program that forms part of the gaming simulation. Part 2 constitutes the 'Players' Manual,' which is the actual document used by the participants during the playing of the game.

PB-242 310/1GA PC$5.25/MF$2.25
Connecticut Univ., Storrs. Inst. of Water Resources.
Water Resources: A Bibliographic Guide to Reference Sources.
Bibliography series,
Valerie Hunter Ralston. Jan 75, 120p* Rept. no. 23, Bib-Ser-2 W75-08486, OWRT-A-999-CONN(16)

Descriptors: *Water resources, *Documentation, Bibliographies, Documents, Abstracts, Directories, Indexes(Documentation), Dictionaries, Libraries, Information retrieval, Encyclopedias.

A detailed study has been made of water resources literature materials; and an inventory of reference sources available and a guide facilitating their location and use have been compiled. Initially undertaken as an attempt to classify the publications of the various water resources research institutes and organizations, emphasis was placed, as the research progressed, on providing a guide to reference materials, and in this way outlining the literature of the field, rather than producing a subject approach to individual items in the University of Connecticut collection. Sections on water resource-related Guides to the literature, Dictionaries, Encyclopedias, Statistics sources, Standards, Bibliographies and Information services are included. In addition to reference titles, pertinent material such as editors or authors' names, publishers and addresses, dates of publication and availability are mentioned.

PB-242 319/2GA
Mag Tape $150.00;Foreign $190.00
Reading, Pa. USAC Project.
Reading USAC Project: STANDARD PERMIT PROCESSING COBOL Computer Program Module, Release Number One.
Software,
Harold George. May 75, 1 reel mag tape USAC-IMIS-RDG-005 HUD/DF-74/016
Contract HUD-H-1212
Specify tape recording mode desired: 9 track, 800 or 1600 bpi, odd parity, EBCDIC; or 7 track, 556 or 800 bpi, odd or even parity, BCD. Price includes documentation, PB-240 162.

Descriptors: *Software, *Local government, *Urban information systems, *Licenses, Processing, Magnetic tapes, COBOL, Computer programs, Inspection, Litigation, Property values, Assessments, Pennsylvania, Building permits.
Identifiers: *Reading(Pennsylvania), Appeals, USAC project, Integrated municipal information systems.

This tape contains the USAC Municipal Standard Permit Processing Module for the Reading Pennsylvania Integrated Municipal Information System (IMIS). This module regulates the processing of permits, inspections, appeal procedures and reports by enhancing the reporting capabilities of the code services bureau. It also provides data regarding change in property value to the property assessment module. There are five programs recorded on the tape...Technical documentation describing this module include, PB-240 162, Design Specifications for the Standard Permit Processing Module; USAC-RPA2-4012, Program Specification for the Standard Permit Processing Module; USAC-RPA2-7012, The User Manual for the Standard Permit Processing Module. 32K bytes of core storage and 32M bytes of disk storage are required to operate this module on a UNIVAC 9300 Model II computer...Software Description: These programs are written in UNIVAC 9300 Model II COBOL programming language for implementation on a UNIVAC 9300 Model II computer using UNIVAC OS500 DNCOS revision 4 operating system. The data base management system is Reading DMT Version 1, Release 1, Level 1.

PB-242 324/2GA PC$3.75/MF$2.25
Northwestern Univ., Evanston, Ill. Dept. of Civil Engineering.
Warrants for Highway - Highway Grade Separations.
Final rept.,
Donald S. Berry, Gilbert T. Satterly, Jr, John H. Shortreed, Paul W. Shuldiner, and Frederick J. Wegmann. Dec 74, 43p
Prepared in cooperation with Illinois State Dept. of Transportation, Springfield. See also PB-170 366.

Descriptors: *Freeways, *Interchanges, *Highway planning, Economic management, Benefit cost analysis, Urban areas, Rural areas, Limited access highways, Streets, Land use, Traffic flow.
Identifiers: *Grade separations, DOT/4CZ/CE, DOT/3B.

This report summarizes the results of case studies relating to the following six potential applications of highway-highway grade separations and interchanges: (1) Freeway vs. Arterial; (2) Freeway vs. Collector; (3) Freeway vs. Local Street; (4) Expressway vs. Arterial; (5) Expressway vs. Local Street, and (6) Arterial vs. Arterial. Cases in both urban and rural areas were examined, with primary emphasis on economic justification of an interchange or a grade separation.

PB-242 327/5GA PC$4.25/MF$2.25
Utah Water Research Lab., Logan.
Development of a Management Framework of the Great Salt Lake.
J. Paul Riley, Calvin G. Clyde, William J. Grenney, Yacov Y. Haimes, and Craig T. Jones. Mar 75, 73p PRJEW116-1 W75-08473, OWRT-A-019-UTAH(1)
Contract DI-14-31-0001-3545

Descriptors: *Water resources, *Water management, *Great Salt Lake, Mathematical models, Systems analysis, Recreation, Shrimps, Water supply, Mineral deposits, Hydrology, Objectives, Assessments, Social effect, Environmental impacts, Legislation, Crude oil, Flow charting, Utah.

The development of a comprehensive management framework of the Great Salt Lake is a complex process involving the cooperation and close coordination of many groups, disciplines, and activities. The study was divided into three separate phases. Phase I provides the overall structural framework for management of the Great Salt Lake, identifies the data needs, and establishes priorities for the development of submodels (both structural and non-structural) for incorporation into the overall framework. Phase II involves the process of developing submodels, and Phase III is concerned with the application of the framework of models to specific management problems. The management framework developed here takes into account the major societal and economic uses of the Great Salt Lake. These uses are (1) recreation and tourism, (2) mineral extraction, (3) transportation, (4) brine shrimp harvesting, (5) oil drilling, and (6) fresh water supply. On the basis of these six major uses, a chart was prepared which lists the potential impacts on cultural and social factors, biological conditions, and physical and chemical characteristics resulting from alterations to the existing lake system.

PB-242 332/5GA PC$7.50/MF$2.25
Peat, Marwick, Mitchell and Co., Washington, D.C.
Survey to Determine the Potential for Improved Rail Advanced Vehicle Service. Work Unit I. Common Carrier Historical and Survey Data.
Final rept.,

John C. Prokopy, Raymond H. Ellis, and Thomas A. Cooney. Dec 72, 228p DOT-FR-20005-1.Vol-1
Contract DOT-FR-20005

Descriptors: *Rapid transit railways, *Market surveys, *Common carriers, Services, Travel demand, Travel patterns, Transit fares, Operating costs, Revenue, Consumer relations, New York, Florida.
Identifiers: DOT/1B, DOT/2C, Chicago(Illinois), Saint Louis(Missouri), Minneapolis(Minnesota), Saint Paul(Minnesota), Seattle(Washington), Portland(Oregon).

The report presents common carrier historical and survey data developed to evaluate the future market potential for improved highspeed rail passenger service. The data were collected for one long-haul and three short-haul corridors: Chicago-St. Louis; Chicago-Minneapolis/St. Paul; Seattle-Portland; and New York-Florida. The report is organized into four parts. The first three parts are contained in Volume I. Part one discusses the development of historical service, fare, and ridership data for the air, rail, and bus modes for the years 1962 through 1971. The second part describes the design and conduct of the survey of common carrier travelers in the four corridors. The third part describes the computer-based common carrier data base of historical and survey data, and presents selected tabulations of this data.

PB-242 333/3GA PC$5.75/MF$2.25
Peat, Marwick, Mitchell and Co., Washington, D.C.
Survey to Determine the Potential for Improved Rail Advanced Vehicle Service. Work Unit II. Rail Cost Analysis.
Final rept.,
Malcolm Laughlin. Dec 72, 127p DOT-FR-20005-2
Contract DOT-FR-20005

Descriptors: *Rapid transit railways, *Cost analysis, Operating costs, Maintenance, Benefit cost analysis, Terminal facilities, Railroad tracks, Travel patterns, Services, Urban transportation, Passenger transportation, New York, Florida.
Identifiers: DOT/1B, DOT/2C, Atlanta(Georgia), Chicago(Illinois), Saint Louis(Missouri), Seattle(Washington), Portland(Oregon), Minneapolis(Minnesota).

The report presents cost data for evaluating the future role of improved high-speed rail passenger service. The costs presented here are at a level of detail which is sufficient for cost-benefit trade-off analysis between different levels of speed and service. Costs which are a function of speed are treated explicitly. Such costs include both capital investment and maintenance and operating costs for 80 mph and 120 mph operation. Each major area of railroad cost is treated to a level of detail which allows specific analysis of a corridor without dependence on generalized averages from other corridors. The application of the costs is demonstrated in an example of cost analysis of a specific corridor service. The example includes comparisons of the effects of speed and load factor.

PB-242 334/1GA PC$5.25/MF$2.25
Peat, Marwick, Mitchell and Co., Washington, D.C.
Survey to Determine the Potential for Improved Rail Advanced Vehicle Service. Work Unit V. Analysis of Alternatives and Development of Recommendations.
Final rept.,
Raymond H. Ellis, and John C. Prokopy. Jul 73, 125p DOT-FR-20005-3
Contract DOT-FR-20005

Descriptors: *Rapid transit railways, *Cost analysis, *Market surveys, Revenue, Services, Socioeconomic conditions, Urban transportation, Mass transportation, Routes, Travel patterns, Transit riders, District of Columbia, New York, Florida, Travel demands.
Identifiers: DOT/1B, DOT/2C, Chicago(Illinois), Minneapolis(Minnesota), Saint Paul(Minnesota), Atlanta(Georgia), Richmond(Virginia), Saint Louis(Missouri), Seattle(Washington), Portland(Oregon).

The report evaluates the potential costs and revenues associated with proposed demonstrations of improved rail service in five short-haul or one long-haul intercity corridors: chicago-St. Louis; Chicago-Minneapolis/St. Paul; Seattle-Portland; New York-Buffalo; Washington-Richmond; and, New York-Atlanta/Florida. The corridors are described in terms of socioeconomic characteristics and intercity transportation facilities and services. The characteristics of the rail routes are presented and the physical and operating constraints on improving rail service are examined. The travel patterns, and traveler characteristics and attitudes toward intercity modes are analyzed. Finally, patronage and revenue estimates are forecast for a number of alternative improved rail operations in each corridor and compared to anticipated costs of initiating and operating such services. The results are analyzed for promising corridors for demonstrations of improved rail service in terms of potential market size and market acceptance.

PB-242 342/4GA PC$5.25/MF$2.25
Florida Univ., Gainesville. Dept. of Soil Science.
Water and Solute Transport in Lakeland Fine Sand.
Doctoral thesis,
Atef A. Elzeftawy. 1974, 118p W75-08480, OWRT-A-026-FLA(1)
Contract DI-31-0001-5009

Descriptors: *Water pollution, *Sands, *Fluid infiltration, Soil water, Adsorption, Soil pressure, Pore pressure, Water influx, Soil analysis, Herbicides, Chlorides, Insecticides, Monitoring, Gamma counters, Tensiometers, Theses.
Identifiers: *Soil water movement, Path of pollutants, D 2-4 herbicide.

The objective was to investigate effects of three water supply rates--2,4 and 8 cm/hr--and three initial soil water contents--1,2, 10.9, and 20.2% by volume--upon the simultaneous transport of water and solutes--2,4-D herbicide and chloride--in vertical columns of Lakeland fine sand. Columns were prepared by packing air-dry soil into cylinders 7.6 cm diameter and 107 cm long. A specific volume of aqueous solution containing 57.9 ppm chloride and 5 ppm 2,4-D was introduced and displaced through each column. Gamma-ray attenuation and pressure-transducer-tensiometers were used to precisely monitor soil-water content and pressure distributions with time. Soil solution was extracted at selected depth intervals along the soil columns and extracted samples were then analyzed for 2,4-D and chloride content.

PB-242 350/7GA MF$2.25
Rhode Island Univ., Kingston.
Fisheries and Energy Production. A Symposium.
Final technical papers,
Saul B. Saila. 1975, 300p* ISBN-0-669-98467-1 EPA/600/3-75-001
Sponsored in part by Atomic Energy Commission, Washington, D.C. Library of Congress Catalog Card no. 74-32513.
Available in microfiche only.

Descriptors: *Thermal pollution, *Fisheries, *Animal ecology, *Meetings, Exposure, Nuclear electric power generation, Steam electric power generation, Entrainment, Larvae, Eggs, Plankton, Fishes, Mortality, Heat stress, Field tests, Mathematical models, Heat tolerance.
Identifiers: Water pollution effects(Animals), Entrapment.

The volume is a series of 12 scientific presentations dealing broadly with the topic of thermal pollution and specifically the effects of entrainment and entrapment of aquatic organisms into electric power plants. The ecological effects of power generation on fisheries is discussed. Field and laboratory studies as well as ecological modelling efforts are described.

PB-242 351/5GA PC$4.25/MF$2.25
Kansas Water Resources Research Inst., Manhattan.
Effect of Holding Time on Retention-Pond Effluent.
Project completion rept.,
Lawrence A. Schmid, and Karl W. Mueldener. Apr 75, 73p Contrib-162 W75-08487, OWRT-A-057-KAN(1)
Contract DI-14-31-0001-3816

Descriptors: *Water quality, *Settling basins, *Sewage treatment, *Lagoons(Ponds), Constraining, Algae, Copper, Algicides, Biochemical oxygen demand, Dissolved gases, Oxygen, Turbidity, Nutrients.
Identifiers: Water quality data, Chemical oxygen demand, Suspended solids, Polishing ponds.

Polishing ponds are often required following extended aeration activated sludge sewage treatment. These polishing ponds are installed to further treat the secondary effluent by sedimentation and flow equalization. The quiescent pond conditions combined with the readily available nutrients in the secondary effluent often result in profuse algal blooms which can result in a lowering of the overall water quality through the pond. Two polishing ponds were monitored for one year to evaluate their effectiveness. It was concluded that polishing ponds serve a useful purpose simply by providing emergency treatment during periods of plant upset.

PB-242 359/8GA PC$6.25/MF$2.25
Fairfax County Office of Comprehensive Planning, Va.
The Legal Basis for a Growth Control System in Fairfax County, Va.
Research paper, 1953-1973,
Robert H. Freilich. 21 Dec 73, 163p FXCO/OCP-75/13, PLUS-RP-2
Prepared in cooperation with Missouri Univ., Kansas City. School of Law.

Descriptors: *Urban growth, *Community planning, *County planning, Virginia, Land use zoning, Ordinances, Regional planning, Public administration, Facilities, Economic surveys, Low income housing, Moderate income housing, Open space land, Legislation, Control.
Identifiers: *Legal aspects, *Fairfax County(Virginia).

The report presents four major pieces of legislation (Interim development controls, adequate public facilities, open space land commission and low-moderate income housing) designed to facilitate the implementation of a managed growth system of development in Fairfax County. With this legislation it should be possible to control and regulate the most serious problems of growth in the rapidly urbanizing sector of the County. Major savings should result with respect to both capital and operating costs of the public sector, as well as the saving of millions of dollars in expended gasoline and energy. Simultaneously it will make possible redevelopment on skipped over or blighted land in the core, preserve open space, rural and agricultural lands and favor development in the rural sector of new towns as opposed to further sprawl.

PB-242 361/4GA PC$5.25/MF$2.25
Fairfax County Office of Comprehensive Planning, Va.
Growth, Change and Environment in Fairfax County. The Environmental Planning Process.
Research paper.
Sep 74, 105p FXCO/OCP-75/15, PLUS-RP-7

Descriptors: *County planning, *Regional planning, *Environmental issues, Air pollution, Noise pollution, Constraints, Open space studies, Objectives, Legislation, Surveys, Virginia.
Identifiers: Air quality maintenance, Fairfax County(Virginia).

The document discusses four major environmental issues - air quality, noise pollution, development hazards, and open space amenities - along with policies, programs and implementation strategies to resolve these major issues. Three primary objectives were formulated to develop policy and program proposals necesary to resolve the major environmental issues: (1) to develop a macro-scale analysis procedure for guiding and evaluating the pattern and intensity of land use; (2) to develop an open space environments, and (3) to develop a procedure for identifying, predicting and evaluating the adverse effects of proposed development projects. The report concludes with a listing of the environmental constraints considered pertinent.

PB-242 363/0GA PC$4.75/MF$2.25
Texas Univ. at Austin. Center for Highway Research.
Development of Methods for Computer Simulation of Beam-Columns and Grid-Beam and Slab Systems.
Final rept.,
John J. Panak. Aug 73, 86p CFHR-3-5-63-56-29F

Descriptors: *Beams(Supports), *Pavements, *Bridges(Structures), *Dynamic structural analysis, *Highway bridges, Slabs, Columns(Supports), Structural engineering, Computerized simulation.
Identifiers: *Finite element analysis, DOT/4CZ/CA, DOT/4CZ/CB.

The research completed under this project was directed toward the development of basic analytical methods using computer simulation for highway bridges, pavements, and similar structures. This report presents a summary of the major computer developments and made during the course of the project. Each development is described briefly and those that are of continuing importance are explained in more detail. The three major areas of development that are included are for line members, two-dimensional plane frames, and plates and grids. These areas encompass most of the structural problems encountered by design engineers.

PB-242 367/1GA PC$4.25/MF$2.25
Peat, Marwick, Mitchell and Co., Washington, D.C.
Development of a Demand Forecasting Framework for Ten Intercity Corridors within the United States.
Final rept.,
Raymond H. Ellis, and John C. Prokopy. Jul 73, 68p DOT-FR-20005-6
Contract DOT-FR-20005

Descriptors: *Rapid transit railways, *Travel patterns, *Northeast Region(United States), Forecasting, Travel demand, Urban transportation, Transportation planning.
Identifiers: DOT/2C, DOT/1B, *Modal split models, *Travel forecasting models, Multimodal transportation.

The report presents the development, implementation, and results of an intercity passenger travel demand forecasting framework for ten corridors within the United States. The study is a portion of the overall multi-modal DOT study of selected high density intercity corridors. The report first presents the development of a data base of travel demand and impedances in the study corridors. Next the demand forecasting process is described. Finally the sets of alternatives tested and supporting assumptions are presented. Basic sets of alternatives considered examined alternative rail services; the effects of energy shortages; CTOL, RTOL and STOL air services, and the relative effect of distance on various rail services share of demand.

PB-242 369/7GA PC$4.75/MF$2.25
Nebraska Univ., Lincoln. Dept. of Civil Engineering.
Algae Removal by Upflow Filtration.
Master's thesis,
James H. Forbes, Jr. Dec 74, 95p W75-08474, OWRT-A-027-NEB(7)
Contract DI-14-31-0001-5027

Descriptors: *Lagoons(Ponds), *Filtration, *Sewage treatment, *Algae, Design criteria, Removal, Efficiency, Flotation, Air flow, Flocculating, Strainers, Biochemical oxygen demand, Theses.
Identifiers: *Upflow filtration, *Suspended solids, Chemical oxygen demand, Microscreening.

Upflow filtration of oxidation ponds has shown promise of being an effective and economical method of removing suspended solids. This preliminary investigation determined some design and operating criteria which should be incorporated in a further study. Some conclusions found: (1) Suspended solids removals of 50% are obtainable on influents in the 110 mg/l range; (2) the upflow unit provided an average 40% BOD and 16% COD reduction; (3) effluent was always of higher quality than the influent with maximum removals occurring during the first hour; (4) the minimum backwash time is five minutes; (5) filamentous algae are consistently removed while smaller algae pass through indicating expansion controls should be initiated; and (6) upflow filtration shows promise of being an effective and economical means of algae removal from oxidation ponds. Color illustrations reproduced in black and white.

PB-242 370/5GA PC$4.25/MF$2.25
California Univ., Davis. Water Resources Center.
Evaluation of a Probability Approach to Uncertainty in Benefit-Cost Analysis.
Completion rept.,
Lloyd J. Mercer, and W. Douglas Morgan. Apr 75, 66p* Contrib-149 W75-08478, OWRT-A-053-CAL(1)

Descriptors: *Water resources, *Benefit cost analysis, *Weibull density functions, Management, Uncertainty, Stochastic processes, Probability density functions.

The research reported here tests the application of the Weibull probability distribution to the problem of uncertainty in benefit-cost analysis. While there is no formal theoretical basis for describing the stochastic behavior of variables in benefit-cost analysis as Weibull distributions, the economy of information, versatility with regard to shape, ability to incorporate objective information, and ease of mathematical manipulation, support the use of the distribution. Compared to range sensitivity tests, the only additional pieces of information required are the probabilities that the actual values of the variable will be less than the low or exceed the high of the range. The Weibull probability assignment technique is applied here for four separate benefit-cost studies concerning water resources. The standard deviation and central tendency measures of the outcome distribution (net benefits, benefit-cost ratio, etc.), as well as the probability of an outcome indicating the project is not feasible, are among the valuable new information provided. The results obtained indicate that the technique tested is a significant improvement over range sensitivity tests to resolve uncertainty in benefit-cost analysis.

PB-242 375/4GA PC$7.00/MF$2.25
Denver Regional Council of Governments, Colo.
Regional Bikeway Systems Planning and Implementation.
Final rept.
May 75, 198p* DRCOG-5-75
Contract DOT-UT-780-1
Prepared in cooperation with Department of Housing and Urban Development, Denver, Colo. Region VIII, and Federal Highway Administration, Washington, D.C.

Descriptors: *Bicycles, *Transportation planning, *Recreational use, Regional planning, Systems analysis, Safety, Benefit cost analysis, Design standards, User needs, Capacity, Community relations, Evaluation, Metropolitan areas, Colorado.
Identifiers: *Bikeways, *Denver(Colorado), Urban trail systems.

A final report is more on a current regional bikeway planning design, and on implementation techniques for developing regional bikeway systems. The objective of this report is to provide a uniform set of design recommendations concerning bicycle facility development to all jurisdictions within the Denver Metropolitan Area.

PB-242 380/4GA PC$3.75/MF$2.25
Peat, Marwick, Mitchell and Co., Washington, D.C.
Variations in Travel Forecasts for Improved High Speed Rail Services in the Northeast Corridor.
Final rept.,
Raymond H. Ellis, and John C. Prokopy. Jul 73, 48p DOT-FR-20005-4
Contract DOT-FR-20005

Descriptors: *Rapid transit railways, *Travel patterns, *Northeast Region(United States), Forecasting, Transit riders, Revenue, Mathematical models, Energy conservation, Fuels, Travel demand, Transportation planning.
Identifiers: DOT/2C, DOT/1B, *Travel forecasting models, *Modal split models.

The report presents 1977 travel forecasts for the Improved High Speed Rail (IHSR) system recommended by the Northeast Corridor Project. The implications for the proposed IHSR patronage and revenue estimates of variations in the following input assumptions were examined: The forecasting model and procedures; The effects of a possible energy crisis with a consequent increase in fuel prices; and The effects of different rates of increase in total travel in the Northeast Corridor.

PB-242 382/0GA PC$4.25/MF$2.25
Peat, Marwick, Mitchell and Co., Washington, D.C.
Analysis of Intercity Modal Split Models.
Final rept.,
J. C. Bennett, J. C. Prokopy, and R. H. Ellis. Jul 73, 64p DOT-FR-20005-5
Contract DOT-FR-20005

Descriptors: *Rapid transit railways, *Travel patterns, *Northeast Region(United States), Mathematical models, Urban transportation, Forecasting, Travel demand.
Identifiers: DOT/2C, DOT/1B, *Modal split models, *Travel forecasting models.

The report examines a number of modal split models for intercity travel forecasting to determine their relative characteristics and modal share estimating capabilities for selected cases. The following calibrations of the Cross-Elasticity Model are considered: CN22, CN25, CN26, CN27, CN28B, HSGT, and SRI along with the PML abstract mode model. Using recent and more reliable travel data, the models are evaluated in terms of their ability to replicate the observed travel patterns and in terms of their implied elasticities for the rail model. Model CN27 was selected as the best overall model among those tested. This model is stratified by purpose, however, which creates a data requirement that cannot always be reliably fulfilled. Thus, the unstratified Model CN22--the second best among those tested--is recommended for use when base year travel data on trip purpose is unavailable.

PB-242 389/5GA PC$4.25/MF$2.25
Charlotte, N.C. USAC Project.
Charlotte USAC Project. The Task 6 Completion Report.
May 75, 57p* MIS-6501/000/01, USAC-CNCO-0157
Contract HUD-H-1216
Supersedes report no. PB-236 885.

Descriptors: *Local government, *Urban information systems, *Management systems, Evaluation, Management information systems, Monitors, Systems analysis, Computer technology.
Identifiers: *Charlotte(North Carolina), USAC project, Integrated municipal information systems.

The report is from a USAC series produced by the city of Charlotte, covering activities from systems analysis through implementation and evaluation of urban information systems. This report documents the results and findings of the University of North Carolina's monitoring and evaluation of the analysis and conceptualization phases of the Charlotte Integrated Municipal Information System Project.

PB-242 395/2GA PC$10.50/MF$2.25
Telcom, Inc., McLean, Va.
Improved Subsurface Investigation for Highway Tunnel Design and Construction. Volume 1. Subsurface Investigation System Planning.
Final rept.,
James L. Ash, Bruce E. Russell, and Robert R. Rommel. May 74, 409p* FHWA/RD-74-29
Contract DOT-FH-11-8036
Prepared by Fenix and Scisson, Inc., Tulsa, Okla. F/S-234.
Paper copy also available in set of 2 reports as PB-242 394-SET, PC$16.00.

Descriptors: *Highways, *Vehicular tunnels, Subsurface investigations, Design criteria, Engineering costs, Tunneling(Excavation), Geologic investigations, Systems analysis.
Identifiers: DOT/4CZ/CC.

This volume covers that study portion which evaluated current subsurface investigation techniques, investigated interactions of the subsurface investigation system elements, produced a value analysis model for indicating the relative value of achieving new levels of performance in a subsurface investigation system, and determined the feasibility of horizontal long-hole drilling. A critical analysis of known subsurface investigative techniques was made. Summaries are organized into groupings for comparison. Techniques not fully utilized or needing additional development are identified.

PB-242 396/0GA PC$7.00/MF$2.25
Telcom, Inc., McLean, Va.
Improved Subsurface Investigation for Highway Tunnel Design and Construction. Volume 2. New Acoustic Techniques Suitable for Use in Soil.
Final rept.,
L. A. Rubin, D. L. Hipkins, and L. A. Whitney. May 74, 184p TER-345-001 FHWA/RD-74-30
Contract DOT-FH-11-8036
Paper copy also available in set of 2 reports as PB-242 394-SET, PC$16.00.

Descriptors: *Highways, *Vehicular tunnels, Subsurface investigations, Tunneling(Excavation), Boreholes, Acoustics, Geologic investigations, Elastic waves.
Identifiers: DOT/4CZ/CC.

The purpose of this study was development of new acoustic techniques suitable for use in soil. Primary consideration was given to determining the location of any rock that may be present between boreholes. A secondary objective was to investigate the potential of acoustic techniques for predicting variations of properties between boreholes. In pursuit of these objectives, the properties of the sonic spectrum in soil were investigated with application to locating discontinuities. A review of potential techniques for improving coupling to soils was also conducted.

PB-242 407/5GA
Mag Tape $150.00;Foreign $190.00
Reading, Pa. USAC Project.
Reading USAC Project: SEWER AND WATER ACCOUNTS PROCESSING Computer Program, Release Number One.
Software,
Harold George. May 75, 1 reel mag tape USAC-IMIS-RDG-002 HUD/DF-75/001
Contract HUD-H-1212
Specify tape recording mode desired: 9 track, 800 or 1600 bpi; odd parity, EBCDIC; or 7 track, 556 or 800 bpi, odd or even parity, BCD. Documentation available.

Descriptors: *Software, *Local government, *Urban information systems, *Water supply, Sewer systems, Consumers, Records management, Billing, Magnetic tapes, Computer programs, Data acquisition, Reporting methods, Pennsylvania, COBOL, Management information systems, Accounting.
Identifiers: *Reading(Pennsylvania), USAC project, Integrated municipal information systems.

This tape contains the USAC Municipal Sewer and Water Accounts Processing (SWAP) Module for the Reading, Pennsylvania, Integrated Municipal Information System (IMIS). This Module maintains records for 29,000 water and sewer customers, post meter readings and calculate periodic consumption, produce water and sewer bills, post bill payments, and provide reports to the users of the system. There are 11 programs recorded on the tape. 32K bytes of core storage and 32M bytes of disk storage are needed to operate this module on a UNIVAC Model 9300 II computer...Technical documentation describing this Module includes: USAC-RPA2-3241, Design Specifications for the Sewer and Water accounts processing Module; USAC-RPA2-4041, Program Specification for the Sewer and Water Accounts processing Module User's Manual...Software Description: These programs are written in COBOL for implementation on a UNIVAC Model 9300 II computer using the UNIVAC 0S500 NCOS Rev. 4 operating system. The Data Base Management System is the Reading DMT Version 1, Release 1, Level 1.

PB-242 408/3GA
Mag Tape $150.00;Foreign $190.00
Reading, Pa. USAC Project.
Reading USAC Project: VEHICLE MANAGEMENT Computer Program Module, Release Number One.
Software,
Harold George. May 75, 1 reel mag tape USAC-IMIS-RDG-003 HUD/DF-75/002
Contract HUD-H-1212
Specify tape recording mode desired: 9 track, 800 or 1600 bpi, odd parity, EBCDIC; or 7 track, 556 or 800 bpi, odd or even parity, BCD. Documentation available.

Descriptors: *Software, *Local government, *Urban information systems, *Vehicles, Management information systems, Magnetic tapes, COBOL, Fuel consumption, Computer programs, Urban planning, Pennsylvania.
Identifiers: *Reading(Pennsylvania), USAC project, Integrated municipal information systems.

This tape contains the USAC Municipal Vehicle Management Module for the Reading, Pennsylvania, Integrated Municipal Information System (IMIS). The programs included on this tape produce from input cards a fuel consumption report. The cards are edited and then used as input to the program that produces a report by vehicle within Bureau showing fuel consumed during the reporting period. Totals are produced by vehicle by Bureau, and by fuel distribution point. There are 2 programs recorded on the tape. 32K bytes of core storage are needed to operate this module on a UNIVAC Model 9300 II computer...Technical documentation describing this module include: USAC-RPA2-3251, Design Specifications for the Vehicle Management Module; USAC-RPA2-4051, Program Specification for the Vehicle Management Module; USAC-RPA2-7051, The Vehicle Management Module User's Manual...Software Description: These programs are written in COBOL for implementation on a UNIVAC Model 9300 II computer using the UNIVAC 0S500 DNCOS revision 4 operating systems. The Data Base Management System is the Reading DMT Version 1, Release 1, Level 1.

PB-242 409/1GA
Mag Tape $150.00;Foreign $190.00
Reading, Pa. USAC Project.
Reading USAC Project: GEOGRAPHIC BASE MAINTENANCE Computer Program Module, Release Number One.
Software,
Harold George. May 75, 1 reel mag tape USAC-IMIS-RDG-004 HUD/DF-75/003
Contract HUD-H-1212
Specify tape recording mode desired: 9 track, 800 or 1600 bpi, odd parity, EBCDIC; or 7 track, 556 or 800 bpi, odd or even parity, BCD. Documentation available.

Descriptors: *Software, *Local government, *Urban information systems, *Property management, Management information systems, Magnetic tapes, Urban planning, Technology transfer, Computer programs, COBOL, Economic development, Pennsylvania.
Identifiers: Geographic base files, *Reading(Pennsylvania), USAC project, Integrated municipal information systems.

This tape contains the USAC Municipal Geographic Base Maintenance Module for the Reading, Pennsylvania Integrated Municipal Information System (IMIS). This module allows property oriented data to be aggregated by area or network. There are 9 programs recorded on the tape. 32K bytes of core storage and 32M bytes of disk storage are needed to operate this module on a UNIVAC Model 9300 II computer...Technical documentation describing this module include: USAC-RPA2-3211, Design Specifications for the Geographic Base Maintenance Module; USAC-RPA-4011, Program Specification for the Geographic Base Maintenance Module; USAC-RPA2-7011, The Geographic Base Maintenance Module User's Manual...Software Description: These programs are written in COBOL for implementation on a UNIVAC Model 9300 II computer using the UNIVAC 0S500 DNCOS Rev. 4 operating system. The Data Base Management system is the Reading DMT Version 1, Release 1, Level 1.

PB-242 410/9GA
Mag Tape $150.00;Foreign $190.00
Reading, Pa. USAC Project.
Reading USAC Project: PROPERTY ASSESSMENT/MAINTENANCE OF OWNERSHIP Computer Program Module, Release Number One.
Software,
Harold George. May 75, 1 reel mag tape USAC-IMIS-RDG-006 HUD/DF-75/004
Contract HUD-H-1212
Specify tape recording mode desired: 9 track, 800 or 1600 bpi, odd parity, EBCDIC; or 7 track, 556 or 800 bpi, odd or even parity, BCD. Documentation available.

Descriptors: *Software, *Urban information systems, *Local government, *Property management, Urban planning, Computer programs, Management information systems, Property values, Magnetic tapes, COBOL, Economic development, Pennsylvania, Ownership, Assessments.
Identifiers: *Reading(Pennsylvania), USAC project, Integrated municipal information systems.

The ownership module provides timely property ownership data which can service all city billing and property owner notification activities. The Property Assessment module secures assessment data from county assessments, maintains assessments for the 28,000 properties within the city of Reading and provides assessment activity reports to the necessary city bureaus. There are 6 programs recorded on the tape. 32K bytes of core storage and 32M bytes of disk storage are needed to operate this module on a UNIVAC Model 9300 II computer...Technical documentation describing this module includes: USAC-RPA2-3212, Design Specifications for the Property Assessment Module; USAC-RPA2-3213, Design Specifications for the Ownership Module; USAC-RPA2-4012, Program Specifications for the Property Assessment Module; USAC-RPA-4013, Program Specifications for the Ownership Module; USAC-RPA2-7012, Property Assessment Module User's Manual; USAC-RPA2-7013, Ownership Module User's Manual...Software Description: These programs are written in COBOL for implementation on a UNIVAC Model 9300 II computer using the UNIVAC 0S500 DNCOS Rev. 4 operating system. The Data Base Management System is the Reading DMT Version 1, Release 1, Level 1.

PB-242 425/7GA PC$9.25/MF$2.25
Illinois Univ., Urbana. Dept. of Civil Engineering.
Stress Histories for Highway Bridges Subjected to Traffic Loading.
Final rept.,
J. A. Ruhl, and W. H. Walker. Apr 75, 323p UILU-ENG-75-2004, Structural Research Ser-416
Report on Illinois Cooperative Highway Research Program Ser-156. Prepared in cooperation with Illinois State Dept. of Transportation, Springfield.

Descriptors: *Highway bridges, *Dynamic loads, Stress analysis, Dynamic response, Bridge decks, Data processing, Field tests, Illinois.
Identifiers: DOT/4CZ/CB.

An investigation of the dynamic response of three continuous highway bridges subjected to both a standard test vehicle and traffic loadings has been conducted. Comprehensive studies of bridge response under traffic loadings were made using data from over 2700 heavy truck traffic crossings; in addition, deterministic studies of bridge behavior were made using data from some 130 test runs with the FHWA vehicle. The experimental data consists of the vehicle characteristics and sets of strain and deflection records for each truck describing the time-history of response at selected locations on the bridge. A comprehensive summary of results and interpretation is presented.

PB-242 427/3GA PC$7.00/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
The Probabilistic Estimation of Construction Performance in Hard Rock Tunnels.
Technical rept. 1972-Jul 74,
Charles H. Minott. Jul 74, 198p* R74-47
NSF/RA/T-74-083
Grant NSF-GI-34029
Also pub. as Tunnel Construction-4.

Descriptors: *Tunneling(Excavation), *Cost estimates, Construction equipment, Construction management, Engineering geology, Probability theory, Computerized simulation, Underground supporting.

This report concerns the development of a computer-based simulation model which can be used to evaluate costs and risks associated with hard rock tunneling. This report is the 4th in a series of reports dealing with this subject. The report examines conventional cost estimating procedures and concludes that there are two major inadequacies which exist, (1) the inability to account for the uncertainty in suspected geologic conditions at the tunnel depth and (2) the inability to quantify the effect of uncertain geology and the effect of the additional uncertainty in productivity of men and equipment on the performance of a construction strategy. The model employs techniques of probability and simulation to avoid these two shortcomings.

PB-242 428/1GA PC$7.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Tunnel Cost Estimating Under Conditions of Uncertainty.
Technical rept. 1972-Sep 75,
Robert David Wyatt. Sep 74, 211p* R75-13
NSF/RA/T-74-084
Grant NSF-GI-34029
Also pub. as Tunnel Construction-5.

Descriptors: *Tunneling(Excavation), *Cost estimates, Construction equipment, Construction management, Engineering geology, Scheduling, Probability theory, Underground supporting, Theses.

Of all areas of heavy construction, tunnel projects are subject to perhaps the greatest degree of uncertainty from the standpoint of predicting cost and progress. Sources of uncertainty include the unknown nature of geologic conditions along the tunnel alignment, and the difficulty of estimating the performance of men and equipment within the narrow confines of the tunnel. In this report a method is presented for explicitly reflecting these uncertainties in estimates of the time and cost of tunnel construction.

PB-242 429/9GA PC$4.25/MF$2.25
Geological Survey, Menlo Park, Calif. Water Resources Div.
Oak Glen Water-Resources Development Study Using Modeling Techniques, San Bernardino County, California.
Water-resources investigations (Final),
William R. Powers, III, and William F. Hardt. Dec 74, 65p USGS-WRI-31-74, USGS/WRD/75/032
Prepared in cooperation with San Bernardino Valley Municipal Water District, Calif.

Descriptors: *Water management, *Ground water, *Surface waters, Mathematical models, Water supply, Predictions, Cost analysis, Water wells, Construction, Water distribution, Economic issues, California.
Identifiers: Conjunctive use, Imported water, San Bernardino County(California).

Hydrologic, digital, and economic analyses were made to determine the most efficient balance of conjunctive use of local ground water, surface water, and proposed supplemental imported water. A non-steady-state and steady-state model was constructed and verified in order to predict water-level changes from 1971-80, under average, wet, and dry conditions. The water-level changes were used to calculate average pumping costs for 1980. The comparable average costs of importing water from an alternative supply and the capital costs of well construction were also determined. The cost of transferring water within the study area and to adjacent areas was appraised.

PB-242 432/3GA PC$3.75/MF$2.25
Washington Cooperative Fishery Unit, Seattle.
Impacts of Forest Management Practices on the Aquatic Environment - Phase II.
Annual rept. 1 Nov 73-31 Oct 74,
R. R. Whitney, and T. E. Wright. 31 Oct 74, 42p
W75-08468, OWRT-C-5336(4223)(2)
Contract DI-14-31-0001-4223
Report on Quinault Resources Development Project.

Descriptors: *Water pollution, *Fresh water biology, *Wood wastes, *Forest land, pH, Organic acids, Fishes, Leaching, Soil chemistry, Stream pollution, Theses, Water quality, Iron oxides, Toxicity, Chemical reactions, Ground water, Reforestation, Washington(State).
Identifiers: Tropolones, Cedar wood, Forest management, Water pollution effects(Animals), Water quality data, Quinault Indian Reservation, Clear cutting.

An investigation of stream quality as related to land use variables was undertaken on the Quinault Reservation. Low pH conditions and cedar leachates have been shown to play a part in low salmonid productivity. Investigations indicate that iron and other heavy metals in the soil matrix play important roles in stream pH levels. Low pH resulting from the release of iron oxides has also been associated with chemical reactions occurring during groundwater movement through areas with different redox potentials. Laboratory analyses indicate that tropolones are the principal toxic substances in Western Red Cedar. Lethal effects of tropolones as related to temperature, iron concentration, acclimatization time, and pH were investigated in laboratory experiments using fish stocks of different genetic composition. No differences were found between genetic stocks or pH variations. Temperature, iron concentrations, and acclimatization times were significant factors in tropolone toxicity. No lethal levels of tropolones were found in study area streams.

PB-242 436/4GA PC$5.25/MF$2.25
IIT Research Inst., Chicago, Ill.
Experimental Study of Mechanics of Rock Fracture by Water Jet.
Final rept. Oct 72-Oct 74,
I. M. Daniel. Apr 75, 125p IITRI-D6074-2
Grant NSF-GI-35705
Supersedes PB-225 896.

Descriptors: *Rock mechanics, *Fracture properties, *Hydraulic jets, *Rock excavation, Cratering, Stresses, Wave propagation, Brittle fracturing.
Identifiers: *Rock fracturing, *Water jets.

Dynamic photoelasticity, high-speed photography and embedded strain gages were used to study phenomena of deformation and fracture of brittle materials by water jet. A device for producing water jets at velocities between 700 m/s to the minus 1 and 2800 m/s to the minus 1 was used. Jet impact on photoelastic materials was studied by means of a spark gap camera operating at 180,000 frames per second and by means of a pulsed ruby laser. Stress wave propagation, stress distributions and fracture were discussed. A threshold level of 850 m/s to the minus 1 was found below which jets did not

produce stress waves but resulted in localized fracture. Jet impact on concrete was studied with embedded gages. Crater volumes in rock were found to vary with powers of up to 5.84 of jet velocity.

PB-242 437/2GA PC$8.50/MF$2.25
Denver Regional Council of Governments, Colo.
Denver Regional Capital Improvement Program. Volume I. Text.
Final rept.
Apr 75, 270p DRCOG-4-75-Vol-1
Prepared in cooperation with Department of Housing and Urban Development, Denver, Colo. Region VIII, and Department of Transportation, Washington, D.C.

Descriptors: *Capital improvements, *Regional planning, *Management planning, Feasibility, Projects, Policies, Objectives, Program design, Planning programming budgeting, Colorado, Water supply, Waste water reuse, Drainage, Parks, Transportation planning, Housing projects.
Identifiers: *Denver(Colorado).

The final report is made of a demonstration project designed to test the technical and political feasibility of developing a workable capital improvement program for the Denver region. The objective of the Denver RCIP was to bring together regional planning processes, policies, goals, and program proposals of regional impact in order to focus on and respond to total regional development efforts and needs.

PB-242 442/2GA PC$9.50/MF$2.25
Volkert (David) and Associates, Bethesda, Md. Environmental Planning and Engineering Div.
Monograph of the Effectiveness and Cost of Water Treatment Processes for the Removal of Specific Contaminants. Volume I. Technical Manual.
Final rept.,
Ian C. Watson, Stephen J. Spano, Howard N. Davis, and Frederick M. Haider. Aug 74, 332p*
EPA/430/9-75-008-Vol-1
Contract EPA-68-01-1833
See also Volume 2, PB-242 443.

Descriptors: *Water treatment, *Cost estimates, Potable water, Chemical removal(Water treatment), Lime-soda ash process, Microorganism control(Water), Ion exchanging, Filtration, Distillation, Electrodialysis, Osmosis, Contaminants, Removal, Effectiveness, Graphs(Charts), Tables(Data).

The monograph provides information on treatment processes for potable water supplies and their costs. It is intended as a general planning document, giving the user general concepts on what treatment methods are available to remove specific contaminants or reduce them below the limits required or recommended by the 1974 Federal Drinking Water Standards and Guidelines. These contaminants may be physical, biological, radiological, or chemical. General cost estimates for the removal or reduction of contaminant levels can be made by using the cost estimation curves and procedures outlined in the monograph.

PB-242 443/0GA PC$4.75/MF$2.25
Volkert (David) and Associates, Bethesda, Md. Environmental Planning and Engineering Div.
Monograph of the Effectiveness and Cost of Water Treatment Processes for the Removal of Specific Contaminants. Volume II, KWIK INDEX.
Final rept.,
Ian C. Watson, Stephen J. Spano, Howard N. Davis, and Frederick M. Heider. Aug 74, 82p*
EPA/430/9-75-008-Vol-2
Contract EPA-68-01-1833
See also Volume 1, PB-242 442.

Descriptors: *Water treatment, *Cost estimates, Potable water, Indexes(Documentation), Water quality, Contaminants, Standards.
Identifiers: KWIC indexes.

The monograph provides information on treatment processes for potable water supplies and their costs. Volume II of the monograph is a KWIK INDEX which provides additional references for more detail information or treatments and costs.

PB-242 444/8GA PC$12.25/MF$2.25
De Leuw, Cather/STV, Washington, D.C.
Northeast Corridor High Speed Rail Passenger Service Improvement Project. Task 7A. Terminals.
Final rept.
May 75, 515p FRA/ONECD-75/7A
Contract DOT-FR-40026
See also PB-242 445.

Descriptors: *Rapid transit railways, *Transportation planning, *Northeast region(United States), Passenger terminals, Design standards, Parking facilities, Urban transportation, Costs, Transportation management.
Identifiers: DOT/2C, DOT/1B, Commuter rail systems.

An essential element of any intercity passenger transport system is the interface with local transportation--both public and private. In recognition of this critical interface, a major task was undertaken to recommend a development program for upgrading fourteen major rail passenger handling terminals in the Corridor. The program was designed to meet overall goals and objectives of convenience, capacity, attractiveness and other level-of-service characteristics commensurate with high quality transportation facilities. The report consists of terminal performance standards, inventories of existing terminals and vicinity access/egress facilities, and recommended concept development plans for the terminals, parking facilities and urban transportation infrastructures in which they are located. Preliminary estimates of costs associated with the development plans are also included.

PB-242 445/5GA PC$10.25/MF$2.25
De Leuw, Cather/STV, Washington, D.C.
Northeast Corridor High Speed Rail Passenger Service Improvement Project. Task 8. Local Coordination System Development.
Final rept.
Mar 75, 388p FRA/ONECD-75/8A
Contract DOT-FR-40026
See also PB-242 444.

Descriptors: *Rapid transit railways, *Transportation planning, *Northeast Region(United States), Maps, Projects, Services, Transportation routes, Transit stations, Transportation management, District of Columbia, Maryland, Delaware, Pennsylvania, New Jersey, Connecticut, Rhode Island, Massachusetts.
Identifiers: DOT/2C, DOT/1B, Commuter rail systems.

The entire Corridor is a scene of widespread transportation planning and implementation activity. State, regional and municipal agencies and carriers are developing plans and programs which will impact upon the Corridor Project. This report is a graphic and verbal compendium of these agencies and their respective plans and programs. Descriptions of local projects include current status, relationship to the Corridor Project and other pertinent data. The report results from extensive investigation and analysis which included review of past studies, as well as formal conferences and meetings with representatives of the interested organizations.

PB-242 460/4GA PC$4.75/MF$2.25
Gulf South Research Inst., Baton Rouge, La.
State Use of Federal Technical Resources. Report of a Study of Federal Resources, Mechanisms, and Barriers Regarding Providing Technical Assistance to the States of Louisiana and Mississippi.
Final rept.,
Jackson M. Balch, Roger D. Rowland, and Kenneth C. Wagner. 5 Apr 74, 88p NSF/RA/R-74/043
Prepared in cooperation with Mississippi Research and Development Center, Jackson.

Descriptors: *Federal assistance programs, *Technical assistance, *State planning and development, Feasibility, Surveys, Participative management, Interviews, Technology transfer, Management methods, Objectives, Local government activities, Government policies, Workshops, Louisiana, Mississippi, Technology innovation, Resource allocation, Finance.

A report is made of a study undertaken to determine if, from the states' point of view, there exists a need to establish a mechanism that would enable the states to take advantage of technology existing within the Federal structure. The study attempted to find ways in which existing Federal technology and technical assistance capabilities might be brought to bear on state problems, on terms acceptable to the states. Interviews were held with key individuals in the major agencies of the States of Louisiana and Mississippi, and two workshops were conducted to provide a forum for participants from both the states and the Federal Government to mutually seek innovative improvements in the technology transfer process.

PB-242 470/3GA PC$6.25/MF$2.25
California Univ., Berkeley. Div. of Structural Engineering and Structural Mechanics.
Computer Program for Curved Bridges on Flexible Bents.
Final rept.,
A. F. Kabir, and A. C. Scordelis. Sep 74, 173p*
UCSESM-74-10
Prepared in cooperation with California State Dept. of Transportation, Sacramento.

Descriptors: *Girder bridges, *Curved beams, Box beams, Folded plates, Stiffness methods, Structural analysis, Harmonic analysis, Computer programs, FORTRAN, User needs.
Identifiers: DOT/4CZ/CB, FORTRAN 4 programming language, Simply supported structures, *Computer aided design.

A computer program is presented for the analysis of continuous prismatic folded plate structures, which are circular in plan and may have up to twelve flexible interior diaphragms or supports. The folded plate structure is considered to be an assemblage of orthotropic plate elements that may, in general, be segments of conical frustra, interconnected at longitudinal joints and simply supported at the two ends. Each plate element is idealized by a number of circumferential finite strips. The finite strip method is used to determine the strip stiffness. Interior diaphragms may be defined by flexible beams, and interior supports may be defined by two-dimensional planar frame bents. A direct stiffness harmonic analysis is used to analyze the assembled folded plate system.

PB-242 510/6GA PC$5.75/MF$2.25
Wisconsin Univ., Madison. Water Resources Center.
Microbial Availability of Phosphorus in Lake Sediments.
Master's thesis,
Aga Sagher. 1974, 135p W75-08578, OWRT-A-040-WIS(2)
Contracts DI-14-31-0001-3550, DI-14-31-0001-3850

Descriptors: *Water pollution, *Inorganic phosphates, *Sediments, *Lakes, Aquatic microorganisms, Algae, Growth, Biomass, Nutrients, Aquatic microbiology, Availability, Test methods, Theses, Wisconsin.
Identifiers: Selenastrum, Scenedesmus.

The microbial availability of phosphorus (P) in surficial sediments from diverse Wisconsin lakes was evaluated using Selenastrum and Scenedesmus and indigenous sediment populations as test organisms. Phosphorus-deficient algal cells were inoculated into nosterile sediment-water systems amended with all growth nutrients except phosphorus so that the sediment was the sole source of phosphorus (0.6 milligrams phosphorus per liter). The inoculated systems were incubated with intermittent shaking under standard light conditions until microbial biomass increases ceased with periodic analysis for: (1) Algal cell counts and AtP to provide data on microbial growth resonses; (2) levels of dissolved otho-inorganic phosphate (Pi), sodium hydroxide-extractable Pi, and hydrochloric acid-extractable Pi to provide information on the utilization of different sediment Pi forms. Appropriate controls were included to establish phosphorus deficiency in the test system and assess sediment organic phosphorus mineralization.

PB-242 512/2GA PC$3.75/MF$2.25
Washington State Water Research Center, Pullman.
Model Development and Systems Analysis of the Yakima River Basin: Fisheries.
Final completion rept.,
Milo C. Bell, and Brian W. Mar. Nov 74, 42p 17F W75-08580, OWRT-B-036-WASH(7)
Contracts DI-14-31-0001-3348, DI-14-31-0001-3663

Descriptors: *Water management, *Fisheries, *Yakima River Basin, Systems analysis, Mathematical models, Runoff, Water quality, Salmon, Trout, Cost analysis, Production, Stream flow, Diverting, Washington(State).
Identifiers: Water management(Applied).

The fisheries model is a simple analytical statement of fish production as a function of wetted area in any given reach. Physical characteristics of each reach are costly to define and fish production is difficult to measure. Sensitivity of fish production to drift in water quality and fishing effort are difficult to formulate. Based on the simple analysis it was demonstrated that the capacity of the river to produce fish cannot be increased more than a factor of 2-4. Furthermore, increase of salmon and steelhead may not be cost effective since major investments in fish passage and screening are required. The release of flows to achieve minimum low flows below diversions can produce significant increases in sport fish, but ponds or other man-made impoundments may be required in the long run.

PB-242 513/0GA PC$5.25/MF$2.25
West Virginia Univ., Morgantown. Dept. of Biology.
Acid Tolerance in the Brown Bullhead 'Ictalurus nebulosus' (Le Sueur).
Master's thesis,
Bruce Edward Sprague. 1974, 110p W75-08581, OWRT-A-017-WVA(3)

Descriptors: *Water pollution, *Mine waters, *Fresh water fishes, *Monongahela River, Bioassay, Acidity, pH, Sulfuric acid, Toxicity, Estimates, Mortality, Temperature, Toxic tolerances, Theses, West Virginia.
Identifiers: Ictalurus nebulosus, *Mine acid drainage, *Water pollution effects(Animals).

TL50 bioassays were conducted to determine the tolerance of the brown bullhead to minimum pH and maximum acidity in a chemically constituted water simulating the mine acid polluted environment of the Monongahela River. An intermittent flow-through system was used with sulphuric acid as the toxicant. The TL50 bioassays were classified as a warm water experiment and two cold water experiments because of temperature variation during the research. The toxicity of sulphuric acid appears to be dependent on the hydrogen ion concentration. The apparent cause of the mortality was asphyxiation from coagulation of mucus on the gill filaments. The TL50 results tend to support the hypothesis that the brown bullhead is one of the most acid tolerant species in the Monongahela River.

PB-242 514/8GA PC$7.25/MF$2.25
Urban Science Center, Washington, D.C.
Growth Management in Florida. Definition Study Phase.
Final rept.
Jul 74, 213p NSF/RA/R-74-035
Grant NSF-DI-42000

Descriptors: *Land planning, *Urban growth, *State planning, Evaluation, Management methods, Criteria, Land use, Legislation, Transferring, Florida, Data files, Information systems, Environmental issues, Water management, Problem solving.

The report describes a study designed to (1) assess growth management practices in Florida, the first state to enact land use legislation based on the American Law Institute model, and (2) develop a transfer mechanism for applying the Florida experience elsewhere. The study is focused on a key feature of the Florida Environmental Land and Water Management Act, the requirement of a Development of Regional Impacts statement, and probes the growth management process both through interviews with carefully selected public and private participants in land development and through preparation of a library of relevant information. It includes the establishment of baseline data in Florida, an assessment of the growth process in terms of legislative impact and criteria, the identification of problems in Florida and their possible solutions, and the development of a transfer package.

PB-242 531/2GA PC$3.75/MF$2.25
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
Effect of Atmospheric Stability and Wind Direction on Water Temperature Predictions for a Thermally-Loaded Stream.
Technical completion rept.,
David R. DeWalle. Jan 75, 36p W75-08576, OWRT-C-4199(9032)(1)
Contract DI-14-31-0001-9032

Descriptors: *Stream flow, *Heat balance, *Thermal pollution, *Susquehanna River, Atmospheric circulation, Heat transfer, Temperature, Numerical analysis, Predictions, Heat loss, Pennsylvania.
Identifiers: *Water temperature.

A steady-state, one-dimensional equation was used to predict water temperatures in the West Branch Susquehanna River at a point 5.4-km downstream from a thermal discharge for 131 time intervals. Two methods were employed to integrate the equation to predict downstream water temperature: direct integration assuming a constant water surface heat exchange rate calculated from upstream water temperature and numerical integration with the heat exchange rate varying with temperature. Two equations were also used to compute evaporative heat exchange: the Jobson form of the familiar Lake Hefner equation derived under conditions of near-neutral stability and a Russian equation modified after Shulyakovskiy which included a correction for free convection. The direct integration method produced overestimates of heat loss and consequently underestimates of downstream water temperatures.

PB-242 537/9GA PC$4.25/MF$2.25
Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning and Standards.
Implementation Plan Review for Indiana as Required by the Energy Supply and Environmental Coordination Act.
Final rept.
Dec 74, 69p EPA/450/3-74-066
Prepared in cooperation with Environmental Protection Agency, Chicago, Ill. Region V, and Argonne National Lab., Ill. Energy and Environmental Systems Div.

Descriptors: *Air pollution, *State programs, *Indiana, Combustion products, Regulations, Sources, Revisions, Assessments, Standards, Inventories, Particles, Sulfur dioxide, Nitrogen oxides, Fuels, Electric power plants.
Identifiers: *Implementation air pollution planning program, *Air pollution abatement, Air pollution standards, Air quality maintenance.

Section 4 of the Energy Supply and Environmental Coordination Act of 1974, (ESECA) requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interfering with the attainment and maintenance of the national ambient air quality standards. This document, which is also required by Section 4 of ESECA, is EPA's report to the State indicating where regulations might be revised.

PB-242 538/7GA PC$3.75/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
St. Louis Bay, St. Louis County, Minnesota, and Douglas County, Wisconsin.
Final rept. for 1972.
May 75, 40p Working Paper-123
Prepared in cooperation with National Environmental Research Center, Las Vegas, Nev., Minnesota Pollution Control Agency, Minneapolis.*Minnesota National Guard, Minneapolis.

Descriptors: *Water pollution, *Saint Louis Bay, Surveys, Inorganic phosphates, Inorganic nitrates, Bioassay, Primary biological productivity, Chemical properties, Water quality, Drainage, Nutrients, Sources, Tables(Data), Minnesota, Wisconsin.
Identifiers: Eutrophication, *Water quality data, Saint Louis County(Minnesota), Douglas County(Wisconsin).

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

PB-242 539/5GA PC$4.75/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
Northboro, Hudson, Maynard, and Billerica Impoundments, Worcester and Middlesex Counties, Massachusetts.
Final rept. for 1972.
Apr 75, 84p Working Paper-219
Prepared in cooperation with National Environmental Research Center, Las Vegas, Nev., Massachusetts Water Resources Commission, Boston. Div. of Water Pollution Control. Massachusetts National Guard, Boston.

Descriptors: *Water pollution, *Northboro Lake, *Hudson Lake, *Maynard Lake, *Billerica Lake, Surveys, Inorganic phosphates, Inorganic nitrates, Bioassay, Water quality, pH, Drainage, Nutrients, Sources, Tables(Data), Massachusetts.
Identifiers: Eutrophication, *Water quality data, Worcester County(Massachusetts), Middlesex County(Massachusetts).

Annual total phosphorus and total nitrogen loadings tc the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

PB-242 544/5GA PC$4.25/MF$2.25
University City Science Center, Philadelphia, Pa.
Storm Water Management Model: Dissemination and User Assistance.
Final rept.,
James A. Hagarman, and F. R. S. Dressler. May 75, 56p EPA/670/2-75-041
Grant EPA-R-802716

Descriptors: *Water pollution, *Surface water runoff, *Data processing, Mathematical models, Data acquisition, Technical assistance, Data transmission, Combined sewers, Overflows, Land use, User needs, New York, New Jersey, Pennsylvania.
Identifiers: *Water pollution abatement, Binghamton(New York), Princeton(New Jersey), Philadelphia(Pennsylvania), *Storm water runoff.

A program of dissemination and user-assistance for the EPA Storm Water Management Model (SWMM) has been developed and implemented at the University City Science Center (UCSC). Services available to SWMM users under this grant include distribution of the SWMM program itself and technical assistance in problem delineation, data preparation, execution debug, and output interpretation. Costs of this service extend only to actual computing costs, with all technical assistance covered by the EPA grant. Several case studies of SWMM applications completed with UCSC assistance in the past year are included in this report. These studies include a combined sewer overflow problem in Binghamton, New York; a land use plan in the Stony Brook basin in Philadelphia, Pennsylvania.

PB-242 546/0GA PC$3.75/MF$2.25
Texas Univ. at Austin. Center for Highway Research.
Continuing Measurements of a Swelling Clay in a Ponded Cut.
Final rept. Jan 70-Aug 73,
Malcolm L. Steinberg. Dec 74, 48p CFHR-3-8-68-118-8
See also PB-215 526.

Descriptors: *Clay soils, *Flooding, *Pavement bases, Expansion, Maintenance, Swelling, Foundations, Service life, Roads, Cost minimization, Texas.
Identifiers: Expansive clays, DOT/4CZ/CA, DOT/4BZ/BA, Bexar County(Texas).

The report continues to explore the effects of ponding, the technique of flooding a clay subgrade with water to cause the soil surface to heave before a pavement is constructed rather than after. Results of observations of the maintenance problems and pavement conditions are noted and an attempt is made to relate the depths of movement and effectiveness of the ponding with the longer range goal of developing a method for reducing costs of roadway life.

PB-242 548/6GA PC$3.75/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
Lake Macatawa, Ottawa County, Michigan.
Final rept.
May 75, 43p Working Paper-200
Prepared in cooperation with National Environmental Research Center, Las Vegas, Nev., Michigan Dept. of Natural Resources, Lansing, and Michigan National Guard, Lansing.

Descriptors: *Water pollution, *Lake Macatawa, Surveys, Inorganic phosphates, Inorganic nitrates, Bioassay, Primary biological productivity, Chemical properties, Water quality, Drainage, Nutrients, Sources, Tables(Data), Michigan.
Identifiers: Eutrophication, *Water quality data, Ottawa County(Michigan).

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survery during the one year study of the lake and its tributaries are included in the report.

PB-242 554/4GA PC$4.75/MF$2.25
Environmental Protection Agency, Washington, D.C. Office of Noise Abatement and Control.
Background Document for Interstate Motor Carrier Noise Emission Regulations.
Oct 74, 86p EPA/550/9-74-017

Descriptors: *Noise pollution, *Noise abatement, *Regulations, *Motor vehicles, Interstate transportation, Motor trucks, Tires, Community relations, Cost engineering, Acoustic measurement, Public health.
Identifiers: Tire pavement interactions, Retrofitting, Residential areas.

This report presents factual information used by EPA which led to the requirements of the motor carrier regulation. Topics discussed are: regulatory strategy, technology for quieting in-use vehicles, costs, measurement methodology, and economic impact. Truck noise sources are analyzed to determine regulatory maximum levels which are consistent with available retrofit technology. Data are presented on relative stringency between the engineering test used by industry and the roadside tests specified by EPA.

PB-242 557/7GA PC$8.50/MF$2.25
Purdue Univ., Lafayette, Ind. Joint Highway Research Project.
Highway Bridge Vibration Studies,
Trakool Aramraks. Feb 75, 275p JHRP-75-2
Prepared in cooperation with Indiana State Highway Commission, Indianapolis.

Descriptors: *Highway bridges, *Vibration, *Psychological effects, Surveys, Responses, Length, Vehicles, Velocity, Surface roughness, Design criteria.
Identifiers: Pedestrians, DOT/4CZ/CB.

The report deals with acceleration studies of highway bridges. The effects of major parameters on the bridge accelerations were investigated and compared to the acceleration criteria for human response. Three different types of highway bridges were investigated; simple span, two span continuous and three span continuous bridges. The parameters selected included those related to the bridge, to the vehicle and to the initial conditions of bridge and vehicle. The results of the investigation indicated the amplitudes of accelerations which psychologically disturbed the pedestrian. Some magnitudes of acceleration were larger than the recommended limit of comfort when the surface roughness of the bridges was taken into account.

PB-242 566/8GA PC$4.25/MF$2.25
Texas Transportation Inst., College Station.
Effects of Temperature, Wind and Humidity on Selected Curing Media.
Interim rept. Sep 69-Aug 74,
Larry D. Groth, A. R. Meyer, and W. B. Ledbetter. Aug 74, 68p TTI-2-6-70-141-3

Descriptors: *Concrete pavements, *Curing, Curing agents, Portland cements, Linseed oil, Evaporation, Moisture content, Temperature, Surface properties, Humidity, Wind velocity, Test methods, Efficiency, Texas.
Identifiers: DOT/4CZ/CA, DOT/4BZ/BC.

A portland cement concrete pavement should possess various qualities to be considered effective. Most important to the driving public is a smooth ride. But the pavement should also be durable and structurally sound, and should maintain surface qualities required for traffic safety with respect to skid resistance. Proper consolidation, finishing, and curing are of particular importance in the production of high quality concrete. This research study summarizes the results of two laboratory studies and one field study conducted to investigate the curing component in producing high quality concrete pavements.

PB-242 567/6GA PC$4.25/MF$2.25
Environmental Protection Agency, Dallas, Tex. Region VI.
Environmental Noise Monitoring at Three Sites in Irving, Texas, November-December, 1974,
George J. Putnicki, and Hal Watson, Jr. Feb 75, 67p EPA/906/9-75-001

Descriptors: *Noise pollution, *Jet aircraft noise, *Airports, Community relations, Acoustic measurement, Computer aided evaluation, Noise abatement, Noise exposure, Statistical methods, Texas, Diurnal variations.
Identifiers: Dallas(Texas), Fort Worth(Texas), *Dallas Fort Worth Airport.

The major objective of this study was to sample and evaluate noise exposures in a community adjacent to Dallas/Fort Worth Airport where aircraft noise complaints have multiplied. The day-night average sound level at three sites was measured for each of seven days using prototype, automatic computerized sound sampling systems and a special iteractive tape recording system. Results were spot-checked with convential equipment. The noise exposure was within the error tolerances of the NEF-CNR contour map predicted for D/FW airport although it exceeded the EPA guideline of 55 dBA Ldn. Aircraft from D/FW were identified as a major noise source.

PB-242 568/4GA PC$3.75/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
Superior Bay, St. Louis County, Minnesota, and Douglas County, Wisconsin.
Final rept. for 1972.
May 75, 40p Working Paper-128
Prepared in cooperation with National Environmental Research Center, Las Vegas, Nev., Minnesota Pollution Control Agency, Minneapolis, Minnesota National Guard, Minneapolis.

Descriptors: *Water pollution, *Superior Bay, Surveys, Inorganic phosphates, Inorganic nitrates, Bioassay, Chemical properties, Water quality, Drainage, Nutrients, Sources, Tables(Data), Minnesota, Wisconsin.
Identifiers: Eutrophication, Water quality data, Saint Louis County(Minnesota), Douglas County(Wisconsin).

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's

trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

PB-242 570/0GA PC$4.25/MF$2.25
International Joint Commission-United States and Canada.
Great Lakes Research Advisory Board.
Semi-annual rept. no. 3, Oct 73-Mar 74.
Apr 74, 74p STIJC-7501
See also Annual rept. no. 2, PB-233 187.

Descriptors: *Water pollution, *Great Lakes, Water quality, Project planning, Industrial wastes, Fishes, Waste water, Sewage treatment, Toxicity, Mercury(Metal), Temperature, Pesticides, Research needs, Objectives, United States, Canada.
Identifiers: *Water pollution abatement.

The third semi-annual report of the Great Lakes Research Advisory Board, April 1974, to the International Joint Commission covers the activities of the board and its seven standing committees. The research advisory board was established under provisions of the Canada-United States Agreement on Great Lakes water quality functions to: Review research activities concerned with and applicable to the quality of the waters of the Great Lakes system; make recommendations to the IJC concerning research needs, and provide scientific advice on specific problems which the IJC and Great Lakes Water Quality board refer to it.

PB-242 590/8GA PC$6.25/MF$2.25
Versar, Inc., Springfield, Va. General Technologies Div.
Water Pollution Investigation: Buffalo River.
Final rept. Jul 73-Jul 74,
Donald H. Sargent. Feb 75, 158p EPA/905/9-74-010
Contract EPA-68-01-1569

Descriptors: *Water pollution, *Buffalo River, Water quality, Industrial wastes, Combined sewers, Overflows, Dissolved gases, Oxygen, Iron, Predictions, Mathematical models, pH, Inorganic nitrates, Inorganic phosphates, Oils, Phenols, Chlorides, New York.
Identifiers: *Water quality data, Dissolved oxygen, Suspended solids.

The Buffalo River was the subject of a comprehensive evaluation of waste loadings and water quality, performed as part of the U.S. Environmental Protection Agency's commitments to abate and control water pollution under the 1972 Great Lakes Water Quality Agreement between the U.S. and Canada. The Buffalo River, as a result of adverse hydraulic conditions and high waste loadings from industrial discharges and from combined sewer overflows, exhibits a summertime dissolved oxygen concentration of less than one mg/l, a contravention of standards for iron, and evidence of poor water quality in most of the other 24 parameters studied.

PB-242 591/6GA PC$10.50/MF$2.25
Ohio Dept. of Health, Columbus.
Lake Erie, Ohio, Pennsylvania, New York Intake Water Quality Summary, 1972.
Summary rept.,
John Wilson, and Art Gedeon. Dec 73, 405p
Prepared in cooperation with Environmental Protection Agency, Washington, D.C., Ohio State Environmental Protection Agency, Columbus., New York State Dept. of Environmental Conservation, Albany, and Pennsylvania Dept. of Environmental Resources, Harrisburgh. See also PB-229 572.

Descriptors: *Water pollution, *Lake Erie, Surveys, Municipalities, Sediments, Chemical properties, Nutrients, Biochemical oxygen demand, Chlorides, Inorganic phosphates, Inorganic nitrates, Sulfates, Algae, Bacteria, Plankton, Metals, Pennsylvania, Ohio, New York.
Identifiers: *Water quality data, Chemical oxygen demand, Dissolved oxygen, Heavy metals.

The report is a summary of progress on the cooperative water quality surveillance program between the Ohio Environmental Protection Agency, New York State Department of Environmental Conservation, Pennsylvania Department of Environmental Resources, municipalities, and the U.S. Environmental Protection Agency at twenty-one (21) water treatment intakes and one industrial water intake in Lake Erie for 1972.

PB-242 598/1GA PC$7.50/MF$2.25
Massachusetts Inst. of Tech., Cambridge. School of Engineering.
A Probabilistic Approach to Geology in Hard-Rock Tunneling.
Technical rept. 1972-Jun 74,
Steven G. Vick. Jun 74, 236p R75-11 NSF/RA/T-74-081
Grant NSF-GI-34029

Descriptors: *Tunnels, *Construction, *Tunneling(Excavation), Probability theory, Engineering geology, Rocks, Cost analysis, Optimization, Blasting, Rock drilling, Boring, Geologic structures, Theses, Compressive strength, Decision making, Adaptation.

The report presents an approach for evaluating alternative strategies for construction of hard-rock tunnels on the basis of expected cost. Central to the proposed approach is the use of subjective degree-of-belief probability in the evaluation of geologic conditions. Subjective probability is used as a quantitative measure of a geologist's uncertainty about the existence of various geologic conditions along the tunnel alignment. The general conclusion of the report is that the proposed approach will lead to a more thorough analysis of the uncertainties involved in predicting geologic conditions, and of the costs of employing various construction strategies in various geologic settings. The approach will not reduce the uncertainties in tunneling, but will lead to the selection of that construction strategy which is most likely to perform successfully and economically in any given hard-rock tunnel.

PB-242 604/7GA PC$10.00/MF$2.25
Environmental Control Technology Corp., Ann Arbor, Mich.
Water Pollution Investigation: Detroit and St. Clair Rivers.
Final rept.
Dec 74, 361p EPA/905/9-74-013
Contract EPA-68-01-1570

Descriptors: *Water pollution, *Saint Clair River, *Detroit River, Surveys, Inorganic phosphates, Inorganic nitrates, Bioassay, Primary biological productivity, Sediments, Mathematical models, Chlorides, Bacteria, Metals, Water analysis, Benthos, Biochemical oxygen demand, Tables(Data), Michigan.
Identifiers: *Water quality data, Dissolved solids, Chemical oxygen demand.

The report presents the results of a historical review and water quality survey of the St. Clair and Detroit Rivers. It includes a three-dimensional, steady-state model for the Detroit River, which will allow for the projection of future water quality based on the results of various management schemes for the Detroit Area. The historical survey illustrates a gradual upgrading of water quality in the region over the past decade, as a result of pollution abatement programs. The water quality surveys performed have provided heretofore lacking or dated information with regards to the biological communities and sediment chemistry.

PB-242 747/4GA PC$7.00/MF$2.25
Cleveland Dept. of Public Utilities, Ohio. Div. of Utilities Engineering.
Water Quality Baseline Assessment for the Cleveland Area, Lake Erie. Volume II. The Fishes of the Cleveland Metropolitan Area Including the Lake Erie Shoreline.
Final rept.,
Andrew M. White, Milton B. Trautman, Eric J. Foell, Michael P. Kelty, and Ronald Gaby. Feb 75, 200p EPA/905/9-75-001
Grant EPA-G-005107
See also PB-238 353.

Descriptors: *Water quality, *Fishes, *Lake Erie, Cuyahoga River, Rocky River, Chagrin River, Abundance, Sampling, Nutrients, Biochemical oxygen demand, Silts, Aquatic plants, Refuse, Chlorides, Inorganic phosphates, Inorganic nitrates, Oils, Sampling, Ohio.
Identifiers: Baseline measurements, *Water quality data, Chemical oxygen demand, Cleveland(Ohio).

The fish fauna in the near shore waters of Lake Erie and the Three Rivers Watershed were investigated from July 1971 through December 1972, and in 1973, 1974. The study established a baseline of the existence of fish species; their relative abundance and distribution; the habitat degradations due to pollution and their effects on changes in fish population diversity, distribution and abundance. Changes in fish species are attributed to stream obstruction, pollution, siltation, loss of aquatic vegetation and other causes.

TT-73-54096/5 PC$4.75
Environmental Protection Agency, Washington, D.C.
Air Conservation. Volume 7, Number 5(37), 1973.
1974, 78p
Unedited trans. of Ochrona Powietrza (Poland) v7 n5(37) 1973, by A. Dangel. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Periodicals, *Air pollution, Industrial plants, Dust, Nitrogen dioxide, Gas analysis, Translations, Poland, Dust filters, Bacteria, Air filters, Neutralization.
Identifiers: Cement industry, Air pollution control, Air pollution detection.

Contents:
- Evaluation of the operating efficiency of electrofilters installed in Poland in 1966-1970;
- Results of the latest tests on methods for determining nitrogen dioxide in atmospheric air;
- Filtration set for removing bacteria and phages from the air;
- Mobile experimental station for neutralization of gases;
- Dust pollution in the vicinity of cement plants 'Warszawa'.

13C. Construction Equipment Materials, and Supplies

AD-A011 180/7GA PC$3.75/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Evaluation of Bentonite Clay for Waterproofing Foundation Walls Below Grade.
Final rept.,
Stanley M. Kanarowski. May 75, 48p Rept no. CERL-TR-M-93

Descriptors: *Waterproofing, *Clay minerals, Walls, Panels, Sprays, Cost estimates, Test methods, Construction materials.
Identifiers: *Bentonite.

Bentonite clay panels and bentonite spray are evaluated for waterproofing the exterior surface of foundation walls below grade. The evaluation is based on a field letter survey and contacts with users, architects, and installers of bentonite panels and applicators of bentonite spray. Two installations were observed to provide first-hand data. Both bentonite systems performed favorably at a cost comparable to conventional systems, but lower than most elastomeric systems. Product information, including responses from the field, cost comparisons, and advantages and limitations for both materials, is given.

AD-A011 265/6GA PC$3.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Use of Regulated-Set Cement in Cold Weather Environments.
Final rept.,
George C. Hoff, Billy J. Houston, and Francis H. Sayles. May 75, 22p Rept no. AEWES-Misc-Paper-C-75-5

Descriptors: *Pavements, *Cold weather, *Cements, Binders, Additives, Freezing, Curing, Compressive properties.
Identifiers: *Regulated set cement, *Cold weather construction.

This study was conducted to evaluate regulated-set cement as a binder material for concrete when the concrete is to be placed and cured at temperatures as low as 15F. Concretes made with the regulated-set cement were studied.

PB-242 197/2GA PC$4.25/MF$2.25
Texas Transportation Inst., College Station.
The Effect of Varying the Modulus and Thickness of Asphaltic Concrete Surfacing Materials.
Interim rept. Sep 71-Oct 74,
Danny Y. Lu, and Frank H. Scrivner. Oct 74, 55p TTI-1-8-69-123-24

Descriptors: *Flexible pavements, *Elastic properties, Design, Formulations, Modulus of elasticity, Thickness, Crack propagation, Highways.
Identifiers: DOT/4CZ/CA, DOT/4BZ/BB.

This report is a theoretical study of the effects of varying the modulus and thickness of asphalt concrete surfacing materials. Three typical flexible pavement design problems at two levels of hot mix asphaltic concrete (HMAC) elastic modulus are analyzed using linear elastic theory. Specific findings are: (1) the use of an HMAS modulus which is much higher than the base course modulus, is discouraged, (2) if a high HMAC - base course modular ratio cannot be avoided, then one should avoid the range from 1 inch to 6 inches of HMAC thickness, and (3) the softening of the base material immediately under the surface layer results in higher tensile stresses at the bottom of the surface layer, and accelerates fatigue deterioration of the pavement.

PB-242 286/3GA PC$4.25/MF$2.25
Ohio State Univ., Columbus. Engineering Experiment Station.
Use of Latex in Concrete Bridge Decks.
Final rept.,
Alfred G. Bishara, and Prasert Tantayanondkul. Jun 74, 74p EES-435 OHIO-DOT-12-74

Descriptors: *Bridge decks, *Concretes, *Latex, *Composite materials, Deicers, Corrosion, Concrete durability, Fracture toughness, Crack propagation, Delaminating, Reinforced concrete.
Identifiers: Concrete polymer composites, DOT/4BZ/BC, DOT/4CZ/CB.

The primary objective of this study is to develop the techniques for efficient and economic use of latex modified concrete and mortar overlays as a means of controlling concrete bridge deck deterioration caused by the use of deicing salts. Test results seem to indicate that: slabs with LMC overlays crack at a load about 25% higher than that for slabs without overlay irrespective of the type and thickness of the overlay. Shear-bond strength between the LMC overlays and the substrate is adequate even after exposure to freeze-thaw cycles. Freeze-thaw resistance of LMC overlays cured for about 6 weeks, was superior to that of air-entrained concrete with embedded reinforcement. The modulus of rupture of LMC exceeds that of AEC by about 50% but its fracture toughness is only 17% higher. Corrosion potential is reduced by use of LMC overlays. Mortar overlays using Dow modifier 'A' gave the best corrosion resistance. For new bridge decks it is recommended to place the overlay after the substrate has cured and its forms removed.

13D. Containers and Packaging

AD-A011 230/0GA PC$6.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Aeroballistics Directorate
Modeling the Impact Response of Bulk Cushioning Materials.
Technical rept.,
Don McDaniel. 9 May 75, 175p Rept no. RD-75-16

Descriptors: *Packing materials, Shock mitigation, Impact, Viscoelasticity, Mathematical models, Computer programs, Regression analysis, Optimization.

The report deals with the use of bulk cushioning materials in shock mitigation systems. The current techniques used in designing bulk cushioning systems are discussed, and an improved technique is presented through the development of a mathematical model of impact response which is based on the viscoelastic properties of bulk cushioning materials. A General Model of impact response which is applicable to all types of bulk cushioning materials and predicts g-level response in terms of drop height, static stress, thickness of cushion, and temperature is developed. A technique for determining the optimal cushioning system design is developed, and examples of the use of the technique are presented for a cross-linked polyethylene foam cushioning material.

13E. Couplings, Fittings, Fasteners, and Joints

PB-242 449/7GA PC$3.25/MF$2.25
Mitsubishi Heavy Industries Ltd., Tokyo (Japan).
Fatigue Strength of Welded Tubular Joints in Offshore Structures.
Mitsubishi technical bulletin,
Susumu Teramoto, Shoji Kaminokado, Tetsuro Kawasaki, and Masaaki Matoba. Apr 75, 19p MTB-100

Descriptors: *Offshore structures, *Welded joints, Fatigue strength at N cycles, Tube joints, Pipe joints, Stress strain diagrams, Fatigue life, Japan.
Identifiers: *Tubular joints.

This paper describes experiments and analyses for a study on fatigue strength of tubular joints generally used for column stabilized drilling units or drilling platforms on the sea. It presents a fundamental guidance and data to designers engaged in this field by discussing the fatigue strength of such joints under complicated stresses and the most effective type of joint.

13F. Ground Transportation Equipment

AD-A011 129/4GA PC$5.75/MF$2.25
Defense Intelligence Agency Washington D C
Electric Vehicle Research, Development and Technology - Foreign,
James D. Busi, and Lawrence R. Turner. Jun 75, 146p Rept no. DST-1850S-403-75

Descriptors: *Ground vehicles, *Electric propulsion, *Foreign technology, Hybrid propulsion, Electric batteries, Economics, Forecasting, Computer programs, West Germany, Great Britain, France, Japan, Belgium, Italy, Sweden, USSR.

The development and production of electric drive vehicles have been successful in the Federal Republic of Germany, Japan, the United Kingdom, the USSR, and to a lesser degree in France, Italy, and Sweden. These vehicles are basically designed for commercial or industrial applications and, in general, a typical vehicle of this type has a maximum range of 60 to 150 miles and a maximum speed of 60 mi/h. Military applications of electric drive vehicles for transportation and combat are significant because they offer a number of advantages over more conventional drive systems.

AD-A011 340/7GA PC$3.75/MF$2.25
Army Tank-Automotive Command Warren Mich
Field and Laboratory Brake Study on the M813, 5-Ton Cargo Truck.
Technical rept.,
Douglas J. Hackenbruch, and Anthony Comito. Nov 74, 38p Rept no. TACOM-TR-11953

Descriptors: *Trucks, *Brakes, Field tests, Braking, Performance tests, Loads(Forces), Specifications.
Identifiers: M-813 trucks(5-Ton), Brake linings.

The purpose of the work was to determine laboratory test parameters for baseline performance requirements on an inertia dynamometer for brake lining friction material for the M813, 5-ton truck. Operation field data were obtained and used in setting test parameters for a laboratory test. A laboratory test specification was developed for replacement brake linings for vehicles in the M809 series of trucks.

PB-241 887/9GA PC$4.75/MF$2.25
Environmental Protection Agency, Washington, D.C. Office of Research and Development.
Federal Surface Vehicle Noise Research, Development, and Demonstration Programs: FY 73 - FY 75.
Final rept.
Mar 75, 96p EPA/600/2-75-002

Descriptors: *Ground vehicles, *Noise(Sound), *Research management, Highway transportation, Rail transportation, Marine transportation, Engine noise, Construction equipment, Acoustic measurement, Noise reduction, Noise standards, Acoustic environments, Federal budgets.
Identifiers: *Noise levels.

The Interagency Surface Vehicle Noise Research Panel was established by the Environmental Protection Agency to aid EPA in fulfilling its responsibility for coordinating the Federal noise research activities. As its initial task, the Panel prepared this report summarizing the Federal government's surface vehicle noise research, development, and demonstration activities. The Federal agencies which sponsor and/or conduct the major portion of the surface vehicle noise RD&D are represented on the Panel. They are the Department of Transportation, the Department of Com-

merce/National Bureau of Standards, the Department of Defense, and the EPA. Other agencies which sponsor surface vehicle noise research are the Department of Agriculture and the National Science Foundation. The report contains brief descriptions and fiscal data for the agencies' programs. Emphasis is on fiscal years 1973 through 1975. Also included are references and bibliographies of reports and publications which have resulted from the Federal surface vehicle RD&D activities.

PB-241 888/7GA PC$5.75/MF$2.25
ENSCO, Inc., Springfield, Va.
DOT Test Train Program, System Instrumentation Manual. Fifth Edition.
Annual rept. Dec 72-Nov 73,
L. Anderson, S. MacIntyre, and N. Kolcyzynski.
Dec 73, 148p FRA-ORD/D-75-04, DOT-FR-74-13
Contract DOT-FR-74-13
Supersedes report dated Dec 72, PB-239 462.

Descriptors: *Rapid transit railways, *Railroad tracks, *Alignment, Geometry, Measurement, Measuring instruments, Calibration, Data processing.
Identifiers: DOT/4IZ/IC, DOT/4DZ/DC, Track geometry.

This manual describes track measurement instrumentation which has been developed during the reporting period, and covers all instrumentation currently installed aboard the FRA Test Cars. The major emphasis of this report deals with the operation and calibration of the Track Geometry Measurement System installed aboard Test Car T-3. Ancillary systems, and equipment aboard Test Cars T-1, T-2 and T-4 is also summarized. The information herein is intended for use by technical personnel who are involved in the operation of FRA Test Car instrumentation, and by engineering and research personnel involved in the application of track geometry measurement techniques.

PB-242 091/7GA PC$4.75/MF$2.25
National Research Council, Washington, D.C. Committee on Motor Vehicle Emissions.
Consultant Report on Field Performance of Emissions-Controlled Automobiles,
R. Robert Brattain, Jack L. Gockel, and D. James McDowell. Nov 74, 86p
Contract EPA-68-01-0402

Descriptors: *Motor vehicle engines, *Exhaust emissions, *Air pollution control, *Maintenance, Catalytic converters, Diesel engines, Rotary combustion engines, Spark ignition engines, Stratified charge engines, Air pollution control equipment, Electric vehicles, Fuels, Economic analysis, Automotive industry.
Identifiers: Catalytic reactors(Exhaust systems), *Automobile exhaust, *Technology assessment, *Motor vehicle inspection.

An evaluation was made of the feasibility of maintaining the automotive emissions control systems and engines which will be manufactured to meet various exhaust-emissions standards for oxides of nitrogen, hydrocarbons, and carbon monoxide so that these systems and engines will meet the standards in actual use. The present condition of the service industry, progress toward enforcing proper maintenance, and the impact of political actions and social attitudes on progress are dicussed.

PB-242 092/5GA PC$5.75/MF$2.25
National Research Council, Washington, D.C. Committee on Motor Vehicle Emissions.
Consultant Report on an Evaluation of Catalytic Converters for Control of Automobile Exhaust Pollutants,
Joe W. Hightower, John B. Butt, David F. Ollis, and Henry Wise. Sep 74, 129p*
Contract EPA-68-01-0402

Descriptors: *Motor vehicle engines, *Exhaust emissions, *Air pollution control, Performance evaluation, Catalytic converters, Diesel engines, Rotary combustion engines, Spark ignition engines, Stratified charge engines, Toxicology, Degradation, Air pollution control equipment, Electric vehicles, Fuels, Economic analysis, Automotive industry.
Identifiers: *Technology assessment, *Catalytic reactors(Exhaust systems), *Automobile exhaust.

An assessment was made of the status of catalysts for automotive emissions control and estimates of the future developments in catalytic converters, especially for oxides of nitrogen removal. The basic performance characteristics and durability, materials supply, toxicology of emissions, and kinetics and modeling of automobile catalysts are discussed.

PB-242 093/3GA PC$6.25/MF$2.25
National Research Council, Washington, D.C. Committee on Motor Vehicle Emissions.
Consultant Report on Emissions and Fuel-Economy Test Methods and Procedures,
Richard A. Matula. Sep 74, 163p
Contract EPA-68-01-0402

Descriptors: *Motor vehicle engines, *Exhaust emissions, *Air pollution control, *Fuel consumption, Catalytic converters, Diesel engines, Rotary combustion engines, Spark ignition engines, Stratified charge engines, Measurement, Tests, Air pollution control equipment, Electric vehicles, Fuels, Economic analysis, Automotive industry.
Identifiers: *Catalytic reactors(Exhaust systems), *Automobile exhaust, *Technology assessment.

An assessment was made of the reliability and reproducibility of the test methods and procedures for automotive emissions and fuel economy measurements. The effect of ambient temperature on exhaust emissions, emissions control durability, test methods, measuring techniques for only reactive hydrocarbons emissions, and evaporative hydrocarbon emissions test methods are discussed.

PB-242 094/1GA PC$9.50/MF$2.25
National Research Council, Washington, D.C. Committee on Motor Vehicle Emissions.
Consultant Report on Manufacturability and Costs of Proposed Low-Emissions Automotive Engine Systems,
LeRoy H. Lindgren, Merrill Ebner, Hayward A. Gay, William A. Johnson, and James Kittrell. Nov 74, 328p*
Contract EPA-68-01-0402

Descriptors: *Motor vehicle engines, *Exhaust emissions, *Air pollution control, *Automotive industry, Catalytic converters, Diesel engines, Rotary combustion engines, Spark ignition engines, Stratified charge engines, Strategies, Investments, Manufacturing, Air pollution control equipment, Electric vehicles, Fuels, Economic analysis.
Identifiers: *Technology assessment, Catalytic reactors(Exhaust systems), *Automobile exhaust.

An assessment was made of the capability of the U.S. automotive industry to produce a variety of emissions control technology for internal combustion engines and to compare the associated fuel, maintenance, sticker price and investment-cost penalties to the driving public.

PB-242 097/4GA PC$8.50/MF$2.25
National Research Council, Washington, D.C. Committee on Motor Vehicle Emissions.
Consultant Report on Emissions Control of Engine Systems,
James E. A. John, Naeim A. Henein, Ernest M. Jost, David Wulfhorst, and John W. Bjerklie. Sep 74, 274p*
Contract EPA-68-01-0402

Descriptors: *Motor vehicle engines, *Exhaust emissions, *Air pollution control, Catalytic converters, Diesel engines, Rotary combustion engines, Spark ignition engines, Stratified charge engines, Air pollution control equipment, Electric vehicles, Fuels, Economic analysis, Automotive industry.

An evaluation was made of the potential of conventional, spark-ignition internal-combustion engines and other internal-combustion engines, such as rotary, diesel and stratified-charge engines, for meeting strict levels of oxides of nitrogen emissions control in conjunction with specified levels of unburned hydrocarbon and carbon monoxide emissions. The potential of alternative, more advanced automotive engines, such as the gas turbine, Stirling, and Rankine power plants, for meeting similarly strict levels of emissions control were assessed.

PB-242 169/1GA PC$4.25/MF$2.25
Texas Transportation Inst., College Station.
Vehicle-Pavement Interaction Study.
Final rept. Sep 68-Oct 74,
R. M. Olson, J. H. Johnson, and B. M. Gallaway. Oct 74, 73p TTI-2-8-69-138-7F

Descriptors: *Tires, *Pavements, Interactions, Rolling friction, Treads, Skid resistance, Surface roughness, Surface drainage.
Identifiers: *Tire friction, DOT/4CZ/CA, DOT/4DZ/DB.

This final report describes methods, procedures, and results of a study commenced in September 1969. Investigations were made in the laboratory on selected pavement surfaces, measurements were made on pavement surfaces on Texas highways and on control surfaces constructed at the Texas A and M Research Annex. The effect of rainfall was examined and an equation was developed to relate water depth to other variables. Finally, an expression was developed relating pavement characteristics, water depth, vehicle speed, and tire tread depth to skid or friction number.

PB-242 250/9GA PC$7.00/MF$2.25
AeroVironment, Inc., Pasadena, Calif.
Reduction of the Aerodynamic Drag of Trucks,
P. B. S. Lissaman. 11 Oct 74, 198p* NSF/RA/N-74-191
Grant NSF-SIA-75-01983
Proceedings of the Conference Workshop held at Pasadena, Calif. on 10-11 Oct 74.

Descriptors: *Trucks, *Aerodynamic drag, *Meetings, Wind tunnel models, Streamlining, Truck tractors, Field tests, Fuel consumption.
Identifiers: *Drag reduction.

These proceedings include the invited papers and summaries of the workshop sessions at the October 10-11, 1974 conference on the Reudction of the Aerodynamic Drag of Trucks. The papers represent the state of the art in devices and testing techniques and results. Most of the available wind tunnel and field test results to date are included. The workshop sessions covered drag and fuel saving evaluation techniques, aerodynamics of drag reduction, and application aspects.

PB-242 353/1GA PC$8.50/MF$2.25
National Research Council, Washington, D.C. Railroad Research Information Service.

Railroad Research Bulletin, Volume 2, Number 1, Spring 1975.
Bibliography Jul 74-Jan 75.
1975, 272p RRIS-7501 FRA-ORD/D-75-42
Contract DOT-OS-40022
See also report dated 1974 PB-241 042.

Descriptors: *Railroads, *Rail transportation, Research, Railroad tracks, Railroad cars, Rights of way, Railroad ballast, Electric railroads, Environmental aspects, Economic factors, Abstracts.
Identifiers: DOT/4DZ/DC, DOT/2C, High speed ground transportation, Announcement bulletins.

This publication contains 1,176 abstracts of journal articles and research reports selected by RRIS from current railroad literature and 235 summaries of ongoing research activities in the railroad field. This material covers the entire range of railroading from technology to operations, management, economics and government involvement. Literature sources are worldwide. The material is arranged according to the RRIS classification scheme in two separate sections, one for journal and report abstracts and one for ongoing project summaries. The book also contains subject term, author, and source indexes. It supplements the material contained in the four prior Railroad Research Bulletins which should be retained for a complete file of RRIS data.

PB-242 387/9GA PC$7.50/MF$2.25
Smith (Wilbur) and Associates, Columbia, S.C.
A Study of the Potential for Improved Rail Advanced Vehicle Service: Highway Analysis.
Final rept.
Sep 73, 250p FRA-OE-74-1
Contract DOT-FR-20004

Descriptors: *Urban transportation, *Rail transportation, *Automobiles, Traffic surveys, Questionnaires, Attitude surveys, Cost analysis, Statistical data.
Identifiers: Chicago Saint Louis corridor, Chicago Minneapolis Saint Paul corridor, Seattle Portland corridor, New York Miami corridor, DOT/4DZ/DC, DOT/4DZ/DB, Travel habits, Travel preference.

Intercity travel in four corridors is analyzed to facilitate the development of a viable rail alternative to alleviate current problems in intercity travel. The specific corridors studied are Chicago-St. Louis, Chicago-Minneapolis-St. Paul, Seattle-Portland, and New York-Miami. The report analyzes competition of rail service by private automobiles. The study includes a review of historic travel trends, a determination of the magnitudes of person travel by auto between selected city pairs in the four travel corridors, a study of the attributes of travel which influence modal choice decisions, and a data base for estimating potential diversion of travelers to improved rail service in each of the major corridors.

PB-242 518/9GA PC$3.75/MF$2.25
Minicars, Inc., Goleta, Calif.
Development of an Advanced Passive Restraint System for Subcompact Car Drivers. Executive Summary.
Final rept.,
Michael Fitzpatrick. May 75, 28p DOT-HS-801 592
Contract DOT-HS-113-3-742
See also PB-241 640.

Descriptors: *Automobiles, *Safety devices, *Anthropometry, Safety engineering, Inflatable structures, Collision research, Crash tests, Structural design, Design standards, Protection, Motor vehicle operators.
Identifiers: *Air bag restraint systems, DOT/5A, DOT/4DZ/DB, Subcompact cars.

The report summarizes the analyses, design, and testing that were conducted to develop an air bag restraint system for the subcompact car capable of protecting the driver in frontal and frontal oblique crashes up to 50 mph. The result of this work has been the development of a small, rapidly inflating dual air bag (inner and outer bags) mounted to a stroke efficient energy absorbing steering column. The lower body energy is absorbed by a crushable knee restraint fabricated of styrofoam. The system ultimately proved capable of protecting subcompact car drivers throughout the adult anthropometric size range at velocities exceeding 50 mph. In addition, the finalized restraint system is constructed of components that are oriented toward eventual mass production.

PB-242 596/5GA PC$6.25/MF$2.25
AMF, Inc., Goleta, Calif. Advanced Systems Lab.
U.S. Research Safety Vehicle (RSV) Phase I Program. Volume I. Introduction and Executive Summary.
Final rept. Jan 74-Apr 75,
J. Andon, E. Dodson, A. Khadilkar, R. Olson, and L. Pauls. Jun 75, 169p ASL-B31 DOT-HS-801 598
Contract DOT-HS-4-00841

Descriptors: *Passenger vehicles, *Human factors engineering, *Safety, Utilization, Motor vehicle accidents, Vehicle safety standards, Specifications, Research.
Identifiers: Vehicle interior components, DOT/5A, DOT/4DZ/DB.

Current passenger car usage patterns and factors influencing usage are analyzed and projections of usage patterns in the mid-1980's are made. Data on six categories of vehicle accidents are analyzed and projections made of national accident patterns in the mid-80's; the effect of potential reductions in these projections as a result of safety programs and other factors related to driving safety are estimated. Based on the usage and accident projections, the characteristics of an RSV (weighing under 3,000 lbs C.W.) for operation in the mid-1980 traffic environment are described. A recommended set of specifications for the RSV are developed considering the potential safety payoff accruing to an increased level of safety performance, the need for energy conservation, availability of material resources, and changes in vehicle mix.

13G. Hydraulic and Pneumatic Equipment

AD-A011 169/0GA PC$5.75/MF$2.25
Oklahoma State Univ Stillwater Fluid Power Research Center
Hydraulic System Controls Study.
Annual rept. on Section 1, 9 Nov 73-8 Nov 74.
Dec 74, 135p Rept no. OSU-FPRC-4M1
Contract DAAK02-72-C-0172
See also report on Section 2, AD-A011 170, AD-779 628, and AD-779 465.

Descriptors: *Hydraulic equipment, *Control systems, Heat exchangers, Thermal analysis, Hydraulic pressure pumps, Hydraulic valves, Hydraulic power, Computer programs, Mathematical models, Nonlinear systems, Simulation.

The purpose of the Oklahoma State University/U.S. Army Mobility Equipment Research and Development Center Program is to provide the military with tools for the scientific appraisal of fluid power systems. The activities of the second year of the systems program are a continuation of the efforts of the first year and make full use of the preceding component specification development program. This is the first section of the complete annual report, which is divided into five self-contained sections. This section covers two broad areas - dynamic simulation and thermal analysis. Under the first area, the accuracy of numerical models (which were first expounded in the previous year report - AD779 628) for portraying nonlinear systems is examined. Data acquisition techniques for formulating static and dynamic numerical models and the effects and noise in measured physical quantities are also discussed.

AD-A011 170/8GA PC$4.25/MF$2.25
Oklahoma State Univ Stillwater Fluid Power Research Center
Hydraulic Noise Study.
Annual rept. on Section 2, 9 Nov 73-8 Nov 74.
Dec 74, 425p Rept no. OSU-FPRC-4M2
Contract DAAK02-72-C-0172
See also report on Section 2, dated Dec 73, AD-779 628 and Section 3 dated Dec 74, AD-A011 171.

Descriptors: *Hydraulic equipment, *Noise(Sound), Acoustic measurement, Noise reduction, Hydraulic pressure pumps, Hydraulic power, Hydraulic valves, Data reduction, Computer programs.

The purpose of the Oklahoma State University/U.S. Army Mobility Equipment Research and Development Center Program is to provide the military with tools for the scientific appraisal of fluid power systems. The activities of the fourth year of the noise program are a continuation of the efforts of the previous years and make full use of the preceding program. This is the second section of the complete annual report, which is divided into five self-contained sections. This report presents the results of a hydraulic noise study which experimentally examined the sound power of selected military components and investigated the effectiveness of noise control techniques for fluid power systems.

AD-A011 172/4GA PC$4.75/MF$2.25
Oklahoma State Univ Stillwater Fluid Power Research Center
Contamination Control.
Annual rept. 9 Nov 73-8 Nov 74 on Section 4.
Dec 74, 83p Rept no. OSU-FPRC-4M4
Contract DAAK02-72-C-0172
See also report on Section 4 dated Dec 73, AD-779 467, Section 3 dated Dec 74, AD-A011 171 and Section 5, AD-A011 173.

Descriptors: *Hydraulic equipment, *Piping systems, *Hoses, Flexural properties, Hydraulic power, Hydraulic fluid filters, Hydraulic seals, Contamination.

The purpose of the Oklahoma State University/U.S. Army Mobility Equipment Research and Development Center Program is to provide the military with tools for the scientific appraisal of fluid dependent systems. The activities pursued under this program during the past year are reflected in the individual sections of this annual report. This section of the annual report is the fourth of five self-contained sections and is concerned with studies in filtration, contaminant analysis, and component wear.

AD-A011 173/2GA PC$5.75/MF$2.25
Oklahoma State Univ Stillwater Fluid Power Research Center
On-Board Hydraulic System Monitor Study.
Annual rept. 9 Nov 73-8 Nov 74 on Section 5.
Dec 74, 142p Rept no. LSU-FPRC-4M5
Contract DAAK02-72-C-0172
See also report on Section 5 dated Dec 73, AD-779 468 and report on Section 4 dated Dec 74, AD-A011 172.

Descriptors: *Hydraulic equipment, *Monitors, Monitoring, Hydraulic power, Diagnosis(General), Diagnostic equipment, Regeneration(Engineering).

The purpose of the Oklahoma State University/U.S. Army Mobility Equipment Research and Development Center Program is to provide the military with tools for the scientific appraisal of fluid power systems. The activities of the second year of the systems program are a continuation of the efforts of the first year and make full use of the preceding component specification development program. This is the fifth section of the complete annual report, which is divided into five self-contained sections. This section reports the activities concerned with a reliability assurance program for fluid power components -- primarily the use of on-board monitors for acquiring field data from operating systems. The major part of the report is devoted to the industrial liaison and hardware development required to instigate the program. A thorough analysis of the accuracy of the methods is presented together with supporting data from tests conducted with production hardware.

AD-A011 496/7GA PC$3.75/MF$2.25
Naval Postgraduate School Monterey Calif
Flow Into a Transonic Compressor Rotor.
Interim rept. Jul 73-Jun 74,
R. P. Shreeve. Aug 74, 33p Rept no. NPS-57Sf74081

Descriptors: *Axial flow compressors, *Turbomachinery, *Transonic characteristics, Flow fields, Axial flow compressor blades, Rotor blades(Turbomachinery), Mathematical models, Inviscid flow, Inlets, Computer programming, Compressible flow, Flow streamline, Boundary layer flow, Blocking, Curve fitting.
Identifiers: TRANSX compressor, IBM 360 computers.

An analytical representation is given for the axisymmetric 2-dimensional flow field at the face of a transonic rotor. Streamlines computed for irrotational inviscid flow are closely approximated using a curve-fitting technique, which is described, and boundary layer blockage is then introduced. With the inlet flow so represented, the conditions relative to the rotor blading of the TRANSX compressor are calculated as a function of the radius and graphed as a function of flow rate and rotor speed. The purpose of this report is to both document calculations carried out for the TRANSX compressor and to record useful analytical techniques and short programs developed.

13H. Industrial Processes

AD-A011 264/9GA PC$3.75/MF$2.25
Watervliet Arsenal N Y
Status of Automatic Drafting Machine Applications.
Technical rept.,
V. H. Montuori. Apr 75, 46p Rept no. WVT-TR-75016

Descriptors: *Drafting, *Mechanical drawing, *Automation, Gun barrels, Tolerances(Mechanics), Engineering drawings, FORTRAN, Computer programs.
Identifiers: *Drafting machines, *Numerical control.

This report summarizes some of the diverse applications of Watervliet Arsenal's automatic drafting machine (ADM). An 'interactive type' application is shown, and the FORTRAN program to enable this process is included. A drafting language program is also included along with other applications involving other features of the ADM.

AD-A011 404/1GA PC$3.75/MF$2.25
Watervliet Arsenal N Y Quality Assurance Directorate
Interface Techniques and Procedures w/Tape Measuring System for Coordinate Measuring Machine.
Final technical rept.,
Vito G. Compisi, Arthur E. Smith, and Joseph Antenucci. Dec 74, 49p Rept no. WVT-QA-7403

Descriptors: *Gun components, *Inspection, *Automation, Computer applications, Production control, Measuring instruments, Positioning devices(Machinery), Computer programs, FORTRAN, Magnetic tape.
Identifiers: *Numerical control.

The application of inspection procedures, ancillary equipment and software programs to interface with computerized coordinate measuring machines (cmm) provides a new measuring system to minimize manual inspection and recording of component parts of a weapon system. Master tapes were generated for inspection of cannon components that can provide tape print out in metric and/or inch mode. Manual inspection and computation are time consuming and subject to human error. The automatic computation that is obtainable with this system, correlated with performance data of components will provide more feedback data to the engineer which will be useful in the improvement of cannon component design.

N75-22761/1GA PC$3.25/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Afdeling Techniek.
Corrosivity Monitoring of Crankcase Lubricating Oils for Marine Diesel Engines.
L. M. Rientsma, and H. Zeilmaker. Oct 74, 17p REPT-200-M, TDCK-65873

Descriptors: *Cases (Containers), *Corrosion, *Diesel engines, *Eccentrics, *Lubricating oils, Acidity, Bases (Chemical), Copper, Electrical resistivity, Metal films, Ships, Time functions.

For abstract, see STAR 1314

N75-22762/9GA PC$3.25/MF$2.25
Ball Bros. Research Corp., Boulder, Colo.
Long Life Lubrication System.
G. H. Ahlborn, J. T. Hinricks, and B. J. Perrin. 1975, 23p TN-75-07
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Lubricating oils, *Lubrication systems, *Service life, *Spacecraft lubrication, Bearings, Contamination, Elastohydrodynamics, Lubricant tests, Mechanical drives, Satellite antennas, Spin reduction.

For abstract, see STAR 1314

PB-242 448/9GA PC$3.25/MF$2.25
Mitsubishi Heavy Industries Ltd., Tokyo (Japan).
A Numerically Controlled Model Propeller Milling Machine.
Mitsubishi technical bulletin,
Hidetake Tanibayashi, and Takao Sasajima. Mar 75, 7p MTB-99

Descriptors: *Marine propellers, *Milling(Machining), *Milling machines, *Numerical control, Milling cutters, Automatic control, Machine tools, Vibration, Contours, Japan.

To achieve the higher accuracy and timely preparation of model tests in both towing tank and cavitation tunnel, a numerically controlled model propeller milling machine has been developed by Mitsubishi Heavy Industries. This machine is controlled by FANUC 230Sb in open-loop system. A software system was also developed which enables any type of propellers to be machined. More than 40 model propellers have been machined already in these two years, since the machine was put into operation. Test results, using model propellers machined by this NC machine, show clearly improvements in accuracy of geometrical shape of the blade section and in uniformity among blades of a propeller. The technique of developing this machine and the software system has been applied to the development of the NC ship propeller milling machine, which was put into operation last year at the Nagasaki Shipyard and Engine Works.

PB-242 496/8GA PC$3.75/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
Failure in Sheet Forming,
I. L. Dillamore, and R. A. Maynard. 1 Apr 75, 37p BISRA-CDL/MT/9/74
Errata sheet inserted.

Descriptors: *Metal working, *Metal sheets, Deep drawing, Steels, Failure, Inclusions, Great Britain.

The role of inclusions in sheet steel for forming applications has received little serious consideration, it being generally considered that formability is limited by plastic instability. Several writers have explicitly rejected the notion that steel cleanliness has any relevance to stretch forming behaviour and so particular attention is paid to this question. It is concluded that while inclusions almost certainly cause failure, the benefits conferred by improved cleanness are strictly limited. Some operations are manifestly influenced by inclusion content and form and these are briefly discussed.

PB-242 526/2GA PC$10.00/MF$2.25
Aerospace Corp., El Segundo, Calif.
Assessment of Domestic Automotive Industry Production Lead Time of 1975/76 Model Year: Volume II. Technical Discussion.
Final rept.,
D. E. Lapedes, M. G. Hinton, Toru Iura, and Joseph Meltzer. Dec 72, 375p* ATR-73(7321)-1
EPA/460/3-74-026-b
Contract EPA-68-01-0417

Descriptors: *Automotive industry, *Lead time, *Production engineering, Tooling, Catalysts, Exhaust emissions, Oxidizers, Roadwheels, Tests, Chassis, Automotive transmissions, Carburetors, Brakes(Motion arresters), Electron beam welding, Precious metals, Surveys.
Identifiers: *Air pollution abatement, Catalytic reactors(Exhaust systems).

The report presents a survey and analysis of the factors involved in bringing automobiles into the market place with emphasis on production engineering, prototype testing and tooling for production of the automobile and the oxidizing catalyst. (Volume 1 is not available from NTIS).

PB-242 574/2GA PC$3.75/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
Towards Improved Submerged-Arc Weld Metal Toughness,
J. G. Garland, and P. R. Kirkwood. Apr 75, 33p BISRA-GS/PROD/MISC/91/74/C

Descriptors: *Submerged arc welding, Welded joints, Toughness, Structural steels, Metallographic structures, Great Britain.

A fundamental study into factors controlling weld metal toughness in structural steel has revealed previously unrecognized correlations between weld metal microstructures and properties, in particular the role of pools of martensitic microphase. A new weld metal toughness model has been evolved, which has proved capable of explaining recorded property levels in submerged-arc welds in structural steels, with and without microalloying additions, over a range of welding consumables (including Mo-

bearing wires) and procedures. Recommendations have been made regarding consumable and procedure selection for critical submerged-arc welding applications and a route for improved wire composition has been identified. Initial work on wire development has produced a family of low carbon-molybdenum-boron-titanium wires with very much superior performance. Work is in progress to translate these results into commercial practice.

13I. Machinery and Tools

AD-A011 422/3GA PC$3.75/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
Compound Mounting Systems that Incorporate Dynamic Vibration Absorbers,
J. C. Snowdon. May 75, 39p
Contract N00017-73-C-1418

Descriptors: *Mountings, *Vibration isolators, Shock absorbers, Dynamics, Machines.

The transmissibility across novel compound or two-stage mounting systems is discussed, and representative calculations of transmissibility are compared for systems with intermediate stages that comprise either (1) a rigid mass plus a dynamic vibration absorber, (2) dual beams loaded symmetrically by equal lumped masses, or (3) dual beams to which multiple dynamic vibration absorbers are attached. In the first case, the undesirable secondary resonance of the compound system can be suppressed effectively by the dynamic vibration absorber, for which appropriate design data are given. In the latter cases, lumped masses or dynamic vibration absorbers are applied to each intermediate beam of the compound system at the locations of the four upper mounts that support the vibrating item from below. In turn, the beams are supported at each end by single antivibration mounts on a rigid foundation.

N75-22324/8GA PC$5.25/MF$2.25
Virginia Univ., Charlottesville.
Steady-State and Transient Analysis of a Squeeze Film Damper Bearing for Rotor Stability.
Final Report.
L. E. Barrett, and E. J. Gunter. May 75, 108p
NASA-CR-2548, ME-4040-114-73U
Contract NGL-47-005-050

Descriptors: *Journal bearings, *Steady state, *Transient response, Cavitation flow, Computerized simulation, Coupling coefficients, Dynamic stability, Friction factor, Reynolds equation, Rotors, Stiffness.

For abstract, see STAR 1314

N75-22361/0GA PC$3.25/MF$2.25
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Porz (West Germany).
The Helios Despin Drive Assembly and Its Bearing System.
E. J. W. Muller. 1975, 21p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Bearings, *Helios project, *Mechanical drives, *Spin reduction, Satellite antennas, Service life, Solar simulation, Solid lubricants, Temperature gradients, Thermal vacuum tests.

For abstract, see STAR 1314

N75-22362/8GA PC$3.25/MF$2.25
Teldix Luftfahrt-Ausruestungs G.m.b.H., Heidelberg (West Germany).
Design and Lubrication of Ball Bearing Unit for Flywheels.
W. Auer. 1975, 25p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Ball bearings, *Flywheels, *Lubrication, *Satellite attitude control, Friction, Lubricating oils.

For abstract, see STAR 1314

N75-22631/6GA PC$3.75/MF$2.25
Pisa Univ. (Italy).
Characteristic Coefficients of Diverse Shaped Hydrostatic Bearings Coefficienti Caratteristici di Pattini Idrostatici di Forme Diverse.
R. Bassani, and C. Culla. 1974, 26p REPT-45
Language in Italian.

Descriptors: *Coefficient of friction, *Liquid bearings, Fluid flow, Lubrication, Numerical analysis, Statistical analysis.

For abstract, see STAR 1314

N75-22756/1GA PC$3.25/MF$2.25
Pisa Univ. (Italy). Ist. di Aeronautica.
A New Type of Hydrostatic Thrust Bearing with Self Regulated Flow UN Nuovo Tipo di Cuscinetto Id Rostatico di Spinta a Doppio Effetto: Il Cuscinetto Autoregolatore di Portata.
R. Bassani. 1974, 14p REPT-48
Conf-Presented at 2D Natl. Aimeta Congr., Naples, 16-19 Oct. 1974.
Language in Italian.

Descriptors: *Flow distribution, *Liquid bearings, Automatic control, Flow velocity, Fluid flow, Pumps.

For abstract, see STAR 1314

N75-22764/5GA PC$3.75/MF$2.25
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Tribology Tests for Satellite Application: Simulation of the Space Enviroment.
E. J. Robbins. 1975, 29p
Contract ESTEC-1560/72-SK
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Mechanical drives, *Space environment simulation, *Spacecraft components, *Water vapor, Accelerated life tests, Ball bearings, Electron bombardment, Proton beams, Solid lubricants, Temperature gradients, Thermal simulation.

For abstract, see STAR 1314

N75-22770/2GA PC$3.25/MF$2.25
Marconi Space and Defence Systems Ltd., Camberley (England).
Procurement-Treatment and Evaluation of Recirculating Ball Screws for Use in Vacuum.
D. E. Stewart, and R. H. Bentall. 1975, 22p
Subm-Sponsored by Esro. Conf-Presented at the Eurpoean Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Ball bearings, *Screws, *Spacecraft environments, *Vacuum, Performance tests, Procurement, Torque.

For abstract, see STAR 1314

N75-22771/0GA PC$3.25/MF$2.25
Laboratoire Suisse de Recherches Horlogeres, Neuchatel (Switzerland).
Bearings for Extreme Environments.
H. Gass, H. E. Hintermann, G. Stehle, and H. M. Briscoe. 1975, 20p
Subm-Partly Sponsored by Esro. Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Ball bearings, *Self lubricating materials, *Spacecraft environments, *Titanium carbides, Coatings, Solid lubricants, Space environment simulation, Vacuum deposition.

For abstract, see STAR 1314

N75-22772/8GA PC$3.25/MF$2.25
Centre National d'Etudes Spatiales, Toulouse (France).
Wear of a Lead Film under Conditions of Small Amplitude Oscillatory Contact.
R. H. Bentall, J. C. Hennequin, and M. Romero. 1975, 21p
Subm-Sponsored by Esro. Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Ball bearings, *Lead (Metal), *Metal films, *Wear tests, Electron microscopes, Friction reduction, Grooves, Oscillations, Solid lubricants.

For abstract, see STAR 1314

N75-22774/4GA PC$3.75/MF$2.25
Hollandse Signaalapparaten N. V., Hengelo (Netherlands).
Application Spiral-Groove Bearings to Space Machinery.
U. Vanderwal. 1975, 26p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Bearings, *Grooves, *Reaction wheels, *Spacecraft environments, Communication satellites, Curves (Geometry), Esro satellites, Flywheels, Greases, Performance tests, Spirals.

For abstract, see STAR 1314

N75-22775/1GA PC$3.25/MF$2.25
Dornier-System G.m.b.H., Friedrichshafen (West Germany).
Tribological Design of the Medium Speed Mechanism (Msm).
M. Granzow. 1975, 21p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Friction reduction, *Mechanical devices, *Satellite antennas, *Spin reduction, Antenna design, Lubricating oils, Thermal vacuum tests.

For abstract, see STAR 1314

N75-22787/6GA PC$3.25/MF$2.25
University Coll., London (England).
Stepping Motor Experience in Space Instrumentation.
T. J. Patrick. 1975, 11p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Ball bearings, *Electric motors, *Satellite instruments, *Service life, *Step functions, Actuators, Mechanical drives, Space environment simulation, Vacuum tests.

For abstract, see STAR 1314

PAT-APPL-517 662/GA PC$3.25/MF$2.25
Energy Research and Development Administration, Washington, D.C.
Method for Testing Wire Rope.
Patent Application,
Gerald W. Lear, Harold E. Lockwood, and Floyd E. Pointer, Jr. Filed 24 Oct 74, 14p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Patent applications, *Nondestructive tests, *Wire rope, Quality con-

trol, Tests, Thermal measurements, Temperature measuring instruments.

The patent application describes a system for determining the quality of wire rope or cable. The thermal increase in a rope when it is performing work is used to determine its quality, a poorer quality rope displaying a larger temperature rise than a higher quality rope.

PAT-APPL-571 821/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A Device for Installing Rocket Engines.
Patent Application.
T. R. George, Jr.. Filed 25 Apr 75, 16p NASA-CASE-MFS-19220-1
Subm-Sponsored by NASA.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Installing, *Rocket engines, Loads (Forces), *Patent applications, Product development, Thrust chambers.

A device for installing rocket engines at a severe cant relative to vertical, while maintaining uniform loading at the thrust chamber exit is proposed. The device is characterized by an axially extensible, tiltable pedestal, a lifting platform for supporting a rocket engine at its thrust chamber exit, a mount with a concentric base characterized by a concave bearing surface, a plurality of uniformly spaced legs extended radially from the base, and an annular receiver coaxially aligned with the base and affixed to the distal ends of the legs for receiving the thrust chamber exit. The lifting platform is concentrically related to the pedestal and is coupled to the extended end portion through a convex bearing surface for accommodating a rocking motion of the platform about an axis angularly related to the longitudinal axis of the pedestal. Mated curved bearing surfaces are employed for coupling a tiltable lifting platform with a pedestal and adapted to support rocket engines at the thrust chamber exits.

PAT-APPL-572 990/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Pasadena Office, Calif.
Motion Restraining Device.
Patent Application.
A. G. Ford. Filed 30 Apr 75, 18p NASA-CASE-NPO-13619-1
Contract NAS7-100
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Brakes (For arresting motion), *Dynamic control, *Energy dissipation, Constraints, Friction, Mechanical engineering, Motion, *Patent applications, Shafts (Machine elements).

A motion-restraining device for dissipating at a controlled rate, the force of a moving body was developed. The device is characterized by a drive shaft adapted to be driven in rotation by a moving body and employs a three-stage motion-multiplying gear train. The force of a moving body may be without resorting to the use of conventional motion-control devices such as escape wheels, two arm pallets, and comparable components.

PB-242 149/3GA MF$2.25
Stock Drive Products, Inc., New Hyde Park, N.Y.
Handbook of Stock Gears Featuring Inch and Metric Sizes, Technical Section. Catalog 75.
1975, 59p
See also PB-233 206.
Paper copy available from Stock Drive Products, 55 South Denton Ave., New Hyde Park, N.Y. 11040 PC$2.95.

Descriptors: *Gears, *Engineering standards, *Handbooks, Sour gears, Helical gears, Worn gears, Backlash, Metric system, Design, Specifications, Shafts(Machine elements), Bearings.

The technical section of handbook contains information required for design and specification of gears. In addition to the material needed for inch-size gear design, attention was given to the growing demand for metric gears. The portion reproduced here, containing pages T9 through T65 is the Technical Section of the Handbook.

PB-242 209/5GA PC$5.25/MF$2.25
Market Facts, Inc., Washington, D.C.
Materials Survey, Educational Diagnosis, and Recommendations for Five Product Categories of Outdoor Power Equipment.
Final rept.
1974, 114p
Prepared in cooperation with Burgmeier (Frank) Co., Syracuse, N.Y.

Descriptors: *Machine tools, *Safety management, *Consumer education, Accident prevention, Saws, Tractors, Consumer protection.
Identifiers: *Instructional materials, Lawn mowers.

A diagnosis was made of educational materials for outdoor power equipment safety, and organizations responsible for developing, distributing, and promoting these to the eventual consumer were identified. The categories of equipment were power mowers, riding mowers and tractors, snow throwers, hedge trimmers, and chain saws. Trade associations are the basic private sources for safety education. While they are effective in getting materials to buyers of new products, their impact on owners of existing materials is questionable. Recommendations were made for a strong Consumer Product Safety Commission campaign emphasizing visual impact.

PB-242 505/6GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
The British Steel Corporation Patent Sling Chain Assembly,
G. Davies. Apr 75, 5p BISRA-SP/ST/DE/0055/2/74/C

Descriptors: *Hoists, Materials handling equipment, Chains, Gantry cranes, Cost analysis, Savings, Great Britain.
Identifiers: *Slings.

It is now almost 4 1/2 years since the patent chain clutch system was first introducted into the Billet Finishing Dept. at Stocksbridge Works. Since this time the system has been successfully introduced into other departments on the works mainly for production slinging applications. In order to highlight the cost advantage of using this system in production slinging applications, an investigation into the cost savings resulting from the introduction of the system on all overhead traveling cranes handling cold work in the Stocksbridge Billet Finishing Dept. has been carried out. This has meant the introduction of seven chain clutch systems in this department. Details are given in the Appendix.

13J. Marine Engineering

AD-A011 175/7GA PC$4.75/MF$2.25
Naval Undersea Center San Diego Calif
Spherical-Shell Sector Windows of Acrylic Plastic with 12,000-Foot Operational Depth Capability for Submersible ALVIN.
Research and Development rept. Mar-Dec 74,
J. D. Stachiw, and R. Sletten. May 75, 97p Rept no. NUC-TP-453

Descriptors: *Submersibles, *Windows, *Acrylic resins, Fabrication, Hydrostatic pressure, Cyclic tests, Deformation, Spheres.
Identifiers: ALVIN vessel, *Spherical shells.

The purpose of the work in this report was to develop spherical-shell sector windows of acrylic plastic for the deep-diving submersible ALVIN, which has a 12,000-foot depth capability. Results show that the spherical windows can be used in ALVIN without modification of the window seat flanges.

AD-A011 363/9GA PC$4.75/MF$2.25
Stevens Inst of Tech Hoboken N J Davidson Lab
Maneuvering Performance of High Speed Ships and Catamarans.
Final rept.,
H. Eda. Jan 74, 87p Rept no. SIT-DL-74-1626
Contract N00014-67-A-0202-0028

Descriptors: *Ships, *Catamarans, *Maneuverability, Steering, Stability, Hydrodynamics, Performance tests, Test facilities, Mathematical prediction, Computer applications, Velocity.
Identifiers: High speed ships.

Dynamic course stability and turning performance of two naval ships, the DL-2 hull form and the ASR catamaran, are examined utilizing the Rotating-Arm Facility combined with a computer analysis. Based on test results of the DL-2 hull form and previous hydrodynamic data of various ship configurations, a computational procedure is developed to evaluate maneuvering performance of high-speed ships at the design stage from major hull parameters. Correlations between predictions and test results indicate the procedure can be effectively used as a design tool.

AD-A011 437/1GA PC$3.25/MF$2.25
Naval Ship Research and Development Center Bethesda Md Ship Performance Dept
Preliminary Propulsion Performance Estimates for an 80-Knot Hydrofoil Craft.
Final rept.,
D. L. Gregory. Jun 75, 19p Rept no. SPD-606-01

Descriptors: *Hydrofoil craft, *Variable pitch propellers, *Takeoff, Thrust, Velocity, Requirements, Marine propulsion, Lift to drag ratio, Cavitation, Computer applications, Mathematical prediction.
Identifiers: *High speed hydrofoil craft.

It is shown that a controllable-pitch propeller can be selected which will meet the takeoff and the maximum speed thrust ratio of 4.5 at 35 knots. It is recommended that auxiliary propulsion devices be investigated to facilitate hydrofoil takeoff.

AD-A011 438/9GA PC$4.25/MF$2.25
Naval Ship Research and Development Center Bethesda Md Ship Performance Dept
The Mean and Oscillatory Forces on a Hydrofoil with Combined Natural and Forced Ventilation from Experiments in Regular Waves.
Final rept.,
R. Stahl, and E. E. Zarnick. May 75, 53p Rept no. SPD-626-01

Descriptors: *Hydrofoil craft, *Hydrodynamics, *Water waves, Lift, Drag, Ventilation, Test methods, Cavitation, Model tests, Water channel test facilities, Wave propagation, Angle of attack, Depth.
Identifiers: Forced ventilation.

An experimental investigation was made to determine the mean and oscillatory lift and drag forces on a hydrofoil with combined natural and forced ventilation in regular waves. Natural ventilation was provided by the addition of

wedges to the after end of the foil strut. Forced ventilation was provided by blowing air through slots in the upper surface of the foil. The experiments were conducted with the foil operating in regular waves of several different lengths at various speeds and foil depths. Results are presented showing the variation of the mean and oscillatory components of cavitation number based on cavity pressure, lift coefficient and drag coefficient with ventilation index (a measurement of the air flow rate).

AD-A011 439/7GA PC$5.25/MF$2.25
Naval Ship Research and Development Center Bethesda Md Ship Performance Dept
Takeoff Experiments for a Newly Designed High Speed Supercavitating Hydrofoil (TAP-1).
Final rept.,
Henry D. Holling. May 75, 103p Rept no. SPD-575-02

Descriptors: *Hydrofoils, *High velocity, *Takeoff, *Flaps(Control surfaces), Flow fields, Experimental design, Test methods, Water channel test facilities, Cavitation, Lift to drag ratio, Optimization, Depth.
Identifiers: *Supercavitating hydrofoils, Angle of incidence, TAP 1 hydrofoils.

The capability to design practical high speed struts and foils with low technical risk has not existed. Therefore, an investigative program was initiated to develop a data base and design criterion for these structures. The takeoff characteristics of a newly designed supercavitating hydrofoil system were experimentally evaluated at NSRDC. Experiments were conducted to find the most favorable combinations of flap angle and incidence angle for takeoff at various foil depths and to determine flow regimes at design takeoff lift conditions.

AD-A011 440/5GA PC$4.25/MF$2.25
Naval Ship Research and Development Center Bethesda Md Ship Performance Dept
The Wave Height Under a High Length-to-Beam Ratio Surface-Effect Ship in Regular Waves.
Final rept.,
David D. Moran. May 75, 52p Rept no. SPD-587-01

Descriptors: *Surface effect ships, *Air cushion vehicles, *Hydrodynamics, Waves, Amplitude, Heaving, Pitch(Motion), Harmonics, Lift fans, Dynamic loads, Ship models.

The Froude-Kryloff hypothesis stating that a wave field in the region of a floating body may be assumed to persist as if the body were transparent to waves has been examined for a high length-to-beam ratio surface-effect ship. The wave amplitude has been measured at several points within the cushion area of a surface-effect ship model free to heave and pitch, in regular head waves. Significant modifications of the encountered wave field were observed at certain wave excitation frequencies. It is not possible, however, at this point to differentiate the sidewall wave generating influence from the effect of the unsteady pressure field in the cushion area of the surface-effect ship model tested.

AD-922 406/4GA PC$6.25/MF$2.25
Presearch, Inc., Arlington, Va.
Potential of Barges in Amphibious Logistics.
Final rept.,
Marion C. Dalby, Martin B. Betts, John P. Scotch, Joseph F. Toomey, and Mark K. Mohler. May 74, 164p PI-TR-247
Contract N00025-73-C-0029
Distribution Limitation now Removed.

Descriptors: *Barges, Amphibious operations, Offshore, Storage, Naval logistics, Handling, Containers, Pontoons, Landing forces, Lighters(Boats), Feasibility studies, Transportation, Pallets, Causeways, Inventory control, Cargo.
Identifiers: Scenarios, Marine amphibious force, Marine amphibious brigade, Seaborne mobile logistic system, LASH(Lighter Aboard Ship), Lighter aboard ship.

This report summarizes a study of the feasibility and military utility of employing barges offshore to supplement land-based logistics in amphibious operations. Resource requirements including types and numbers of barges and supporting equipment are identified. Problem areas and hardware development objectives are identified, and recommendations for specific action are made.

N75-22547/4GA PC$3.75/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Scheepsbouw Afdeling.
The Behaviour of a Ship in Head Waves at Restricted Water Depths.
J. P. Hooft. Aug 74, 31p REPT-188-S, TDCK-65207

Descriptors: *Shallow water, *Ships, *Water waves, Equations of motion, Force distribution, Froude number, Heaving, Hydrodynamic equations, Pitch (Inclination), Thrust measurement.

For abstract, see STAR 1314

N75-22548/2GA PC$3.25/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Scheepsbouw Afdeling.
Utl Acoustical Effects of Mechanical Short-Circuits Between a Floating Floor and a Steel Deck.
J. Buiten, and J. W. Verheij. Sep 74, 12p REPT-199-S, TDCK-65702

Descriptors: *Floating, *Floors, *Noise reduction, *Ships, Asphalt, Foams, Insulation, Mechanical properties, Plastics, Short circuits, Steels, Waterproofing.

For abstract, see STAR 1314

N75-22786/8GA PC$3.25/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Afdeling Techniek.
Maritime Transportation of Containerized Cargo. Part 5: Fire Tests in a Closed Aluminium Container.
H. J. Souer. Nov 74, 17p REPT-202-M, TDCK-65874

Descriptors: *Aluminum, *Cargo ships, *Fireproofing, *Tanks (Containers), Bottles, Crews, Fire damage, Flash point, Leakage, Liquids, Risk.

For abstract, see STAR 1314

N75-22821/3GA PC$3.25/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Scheepsbouw Afdeling.
Hull Resonance No Explanation of Excessive Vibrations.
S. Hylarides. Mar 74, 17p REPT-192-S, TDCK-65206

Descriptors: *Marine propulsion, *Resonant vibration, *Ship hulls, *Ships, Afterbodies, Cavitation flow, Hydrodynamics, Propellers, Shafts (Machine elements), Vibration mode, Wakes.

For abstract, see STAR 1314

N75-22822/1GA PC$3.75/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Scheepsbouw Afdeling.
Numerical Hull Vibration Analysis of a Far East Container Ship.
P. Meijers. Jul 74, 28p REPT-195-S, TDCK-65495

Descriptors: *Finite element method, *Ship hulls, *Ships, *Vibration mode, *Water, Containers, Eigenvalues, Elastic bodies, Stiffness matrix, Subroutines.

For abstract, see STAR 1314

N75-22823/9GA PC$3.25/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Afdeling Techniek.
Transverse Vibrations of Ship'S Propulsion System. Part 1: Theoretical Analysis.
S. Hylarides. Oct 74, 20p REPT-197-M, TDCK-65871

Descriptors: *Cargo ships, *Finite element method, *Propulsion system configurations, Dynamic structural analysis, Marine propulsion, Propellers, Resonant frequencies, Resonant vibration, Shafts (Machine elements), Transverse waves.

For abstract, see STAR 1314

N75-22824/7GA PC$3.25/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Afdeling Techniek.
Transverse Vibrations of Ship'S Propulsion Systems. Part 2: Experimental Analysis.
L. J. Wevers. Dec 74, 20p REPT-203-M, TDCK-65875

Descriptors: *Cargo ships, *Finite element method, *Propulsion system configurations, Impact tests, Marine propulsion, Oils, Propellers, Resonant vibration, Thin films, Transverse waves.

For abstract, see STAR 1314

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-A011 171/6GA PC$4.75/MF$2.25
Oklahoma State Univ Stillwater Fluid Power Research Center
Lubricating Oil Filtration Study for Mobile On-Off Highway Diesel Engine Driven Vehicles.
Annual rept. 9 Nov 73-8 Nov 74 on Section 3. Dec 74, 475p Rept no. OSU-FPRC-4M3
Contract DAAK02-72-C-0172
See also report dated Dec 73, AD-779 466, and Section 4, AD-A011 172.

Descriptors: *Diesel engines, *Lubricating oils, *Oil filters, Contaminants, Additives, Particle size, Abrasives, Specifications.

The purpose of the Oklahoma State University/U.S. Army Mobility Equipment Research and Development Center Program is to provide the military with tools for the scientific appraisal of fluid dependent systems. The activities pursued under this program during the past year are reflected in the individual sections of this annual report. This section of the annual report is the third of five self-contained sections. This section provides a detailed account of the effort expended in developing a family of lube oil filter test procedures which could have the blessing of industry and still serve the needs of the U.S. Army. Although it represents a one-year effort, the experience gained in a parallel program for hydraulic filters enhanced the success factor and accelerated the project pace.

N75-22322/2GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

Analysis of a Stability Valve System for Extending the Dynamic Range of a Supersonic Inlet.
J. A. Webb, Jr., and M. O. Dustin. May 75, 39p NASA-TM-X-3219, E-8114

Descriptors: *Control valves, *Pressure regulators, *Supersonic inlets, Analog computers, Bypasses, Computerized simulation, Design analysis, Perturbation, Wind tunnel models.

For abstract, see STAR 1314

N75-22744/7GA PC$5.75/MF$2.25
Marquardt Corp., Van Nuys, Calif.
Line Fluid Actuated Valve Development Program.
Final Report.
R. A. Lynch. Jan 75, 126p NASA-CR-141780, TMC-3293-6-3
Contract NAS9-13684

Descriptors: *Control valves, *Design analysis, *Propellant actuated devices, *Space shuttles, Leakage, Life (Durability), Low pressure, Performance tests, Structural weight, Vibrational stress.

For abstract, see STAR 1314

N75-22815/5GA PC$3.25/MF$2.25
Pisa Univ. (Italy).
Experimental Research on Collapse Loads and Phenomena for the Plastic Assessment of a Steel Pipeline Ricerca Sperimentale Sui Carichi di Collasso E Sui Fenomeni di Assestamento Plastico di Una Tubazione in Acciaio.
G. Nerli, and P. Citti. 1974, 14p REPT-43
Subm-Sponsored by Cnr.
In Italian; English Summary.

Descriptors: *Collapse, *Pipes (Tubes), *Steels, Elastic properties, Loads (Forces), Plastic properties, Yield strength.

For abstract, see STAR 1314

PAT-APPL-566 493/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Pasadena Office, Calif.
Solar Powered Pump.
Patent Application.
C. C. Kirsten. Filed 9 Apr 75, 19p NASA-CASE-NPO-13567-1
Contract NAS7-100
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Arid lands, *Farm crops, *Irrigation, *Pumps, *Water flow, Low cost, *Patent applications, Solar energy.

A low cost water pump suitable for use in agricultural irrigation in underdeveloped regions is disclosed. The pump is adopted to use unconcentrated sunlight as a source of energy and atmospheric air as a working fluid for intermittently delivering a stream of water from a given source.

PATENT-3 879 244 Not available NTIS
Department of the Air Force Washington D C
Method of Making High Modulus Graphite Fiber Reinforced Tubes.
Patent,
Mike Varlas. Filed 18 Apr 73, patented 22 Apr 75, 4p Rept nos. PAT-APPL-352 385,
Supersedes AD-164 590.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Tubes, *Patents, Fiber reinforced composites, Carbon fibers, Reinforced plastics, Graphite, Epoxy resins, Polyimide resins, Fabrication.
Identifiers: PAT-CL-156-192, Carbon fiber reinforced plastics, Graphite reinforced composites, Epoxy matrix composites, Polyimide matrix composites, Oriented fiber composites.

The patent concerns itself with a method for fabricating a tubular structural element having a wall structure composed of layers of a graphite fiber-reinforced resin composite in which the graphite fibers are oriented 45 degrees from the zero degree longitudinal axis of the tubular element.

13L. Safety Engineering

AD-A011 373/8GA PC$3.75/MF$2.25
Washington Univ Seattle Dept of Mechanical Engineering
Modeling of Shipboard Fire Suppression.
Annual rept. Year 2, 1 Jul 73-30 Jun 74,
R. C. Corlett. 13 Jun 75, 27p
Contract N00014-67-A-0103

Descriptors: *Ship fires, *Fire suppression, Smoke, Gases, Toxicity, Shipboard, Naval research, Mathematical models.

Further smoke production measurements are reported. Smoke production per unit mass is deduced on the basis of exhaust stream CO2 concentration data. A matrix of fire suppression tests with water spray and CO2 has been carried out in the 6x6x6 ft fire enclosure and in a 2x2x2 ft scale model enclosure. A simple correlation indicative of a concise scaling rule was not expected and, in fact, did not result. But the data do constitute a basis for evolution of an empirically adjusted rational model whose intended application is extension of small scale or otherwise inexpensive test data to larger scale or relatively expensive situations.

COM-75-10750/8GA PC$3.25/MF$2.25
National Bureau of Standards, Washington, D.C. Center for Fire Research.
Report of Fire Test on an AM General Metro Bus.
Final rept.,
Emil Braun. Jun 75, 22p NBSIR-75-718

Descriptors: *Fire safety, *Transit buses, Research, Ignition, Fires, Seats, Upholstery, Tests, Flammability, Flux(Rate), Smoke, Standards, Motor vehicles, District of Columbia.

A study of the fire safety of a bus supplied by the Washington, D.C. Metropolitan Transit Authority was conducted. The objectives of the work were: (1) to determine the minimum ignition from source necessary to initiate a fire in the bus, and (2) to determine the means by which a fire, once started, is most likely to grow and spread. A series of small-scale laboratory tests were run in addition to the three full-scale tests. Tests showed that accidental ignition by a cigarette or dropped match in unlikely. However, the seat can be ignited with one or two matches, if applied at the proper location, as by an arsonist. In full-scale tests, ignition of the seat occurs readily with the following ignition sources: (1) a small bag of paper trash on the seat, (2) a newspaper under the seat, or (3) if the contents of a can of lighter fluid is poured on the seat. Fire growth and spread in the bus is primarily through involvement of the seat cushioning. Fire spreads from seat to seat with little direct involvement of other interior materials. In all three tests, between one or two minutes after the urethane ignited, dense smoke filled the bus space seriously reducing visibility. Spread of fire beyond the seat of origin is not necessary for the level of smoke to be formed.

PB-242 207/9GA PC$4.75/MF$2.25
Gillette Co. Research Inst., Rockville, Md. Harris Research Labs. Dept.
An Ignition Test for Assessing the Flammability of Toys.
Final rept.,
George B. Arnold, and Norman R. S. Hollies. 15 Dec 72, 88p
Contract FDA-72-129
Prepared in cooperation with Food and Drug Administration, Bethesda, Md. Bureau of Product Safety.

Descriptors: *Consumer products, *Product safety, *Flammability, Ignition, Tests, Injuries, Children, Accident prevention.
Identifiers: *Toys.

An ease of ignition test based on 'time to ignition' was developed for assessing the flammability of toys. It appeared from frequency distribution that a breaking point in 'times to ignition' for toys was around 5 seconds, differentiating clearly hazardous toys from those which are less hazardous. The equiomnt used is described, and specific tests results are charted.

PB-242 210/3GA PC$10.00/MF$2.25
Kirschner Associates, Inc., Washington, D.C.
Household Survey Conducted as Part of the Educational Diagnosis of Selected Hazardous Consumer Products.
Final rept.,
Sherrie S. Aitken, Joanne Frankel, Anita Schwartz, and Doris Miller. 15 Mar 75, 374p

Descriptors: *Consumer products, *Safety engineering, *Consumer protection, Consumer complaints, Hazards, Accident prevention, Injuries, Flammability, Consumer patterns, Consumer problems, Attitudes, Bicycles, Furniture, Clothing, Hazardous materials.

A consumer survey was conducted to determine the attitudes, awareness, knowledge level, and practice habits of persons most likely to be injured and affected by the hazards of four product categories. These are: (1) bicycles; (2) children's recreational equipment such as playground equipment, snow skis, swimming pools and snowmobiles; (3) home-related products such as nursery furnitures, stairs, ramps, landings, porches, architectural glass, and TV's; and (4) flammable products and ignition sources such as clothing, mattresses, ovens, and flammable liquids. Educational programs were recommended based on the surveys findings.

PB-242 233/5GA PC$3.25/MF$2.25
National Transportation Safety Board, Washington, D.C. Bureau of Surface Transportation Safety.
Railroad Accident Report. Long Island Rail Road Company Door Accident Huntington Station, New York, December 1, 1974.
30 Apr 75, 25p NTSB-RAR-75-5, SS-R-35

Descriptors: *Rapid transit railways, *Doors, *Accident investigations, Accidents, Railroad cars, Passenger movement, Casualties, Transit stations, Platforms, Inspection, Safety engineering, Transportation problems, Design standards, New York.
Identifiers: *Railroad accidents, *Commuter rail systems, *M-1 railcars, Huntington station, Huntington(New York).

At 9:48 a.m., e.s.t., December 1, 1974, a man was killed as a Long Island Rail Road commuter train departed Huntington Station, N.Y. The victim had attempted to exit the standing train, but he was initially trapped between two sliding doors as they closed on him. This kept the doors open far enough for the door power-interlock to prevent the engineer from starting the train. When the man succeeded in moving

the upper part of his body to the outside, the doors closed and locked on his right ankle, enabling the train to start. Since none of the crewmembers had observed the victim's entrapment, the conductor gave the 'all clear' signal, and the engineer started the train. The National Transportation Safety Board determines that the probable cause of this accident was the design of the sliding doors which permitted the train to be moved without a positive means for detecting the presence of a person caught between the doors.

PB-242 346/5GA PC$4.25/MF$2.25
California Univ., Berkeley. Fire Research Group.
COMPF: A Program for Calculating Post-Flashover Fire Temperatures,
Vytenis Babrauskas. Jan 75, 58p* UCB-FRG-75-2 NSF/RA/E-75-022
Grant NSF-GI-43
Prepared in cooperation with Department of Housing and Urban Development, Washington, D.C., and National Bureau of Standards, Washington, D.C.

Descriptors: *Fire safety, *Gas dynamics, *Fire resistance, Computer programs, Fire tests, Buildings, Temperature measurement, Mathematical prediction, Fire protection, Fire walls, Handbooks, FORTRAN.
Identifiers: COMPF computer program, FORTRAN 4 programming language, CDC 6400 computers.

COMPF is a computer program for calculating gas temperatures in a compartment during the post-flashover period of a fire. It is intended both for performing design calculations and for facilitating further research in endurance requirements for fire-resistive building assemblies. In addition to the capability of performing calculations for a compartment with completely determined properties, routines are included for calculating the fire behavior under certain worst expected conditions. A comprehensive output format is provided which gives gas temperatures, heat flow terms, and properties of the fire gases. The report includes input instructions, sample problems, and a listing of the program.

PB-242 400/0GA PC$7.25/MF$2.25
New York City-Rand Inst.
Simulation Model of Fire Department Operations: Program Description,
Grace M. Carter. Dec 74, 206p* R-1188/2-HUD/NYC
Contract HUD-H-2164
Paper copy also available in set of 2 reports as PB-242 399-SET, PC$9.00.

Descriptors: *Fire departments, *Fire fighting, *Computerized simulation, *New York, Computer programs, Deployment, Algorithms, Metropolitan areas, Urban areas, Fire fighting vehicles, Management planning, Allocations, Management information systems, Compilers, Emergency planning.
Identifiers: SIMSCRIPT programming language.

The report describes the program and its data requirements in sufficient detail that a user who is familiar with SIMSCRIPT should be able to run or modify the program. Flowcharts, complete program listings, sample data decks, and program outputs are included.

PB-242 401/8GA PC$3.25/MF$2.25
New York City-Rand Inst.
Simulation Model of Fire Department Operations: Executive Summary,
Grace Carter, Jan Chaiken, and Edward Ignall. Dec 74, 24p* R-1188/1-HUD
Contract HUD-H-2164
Paper copy also available in set of 2 reports as PB-242 399-SET, PC$9.00.

Descriptors: *Fire departments, *Fire fighting, *Computerized simulation, *New York, Deployment, Metropolitan areas, Urban areas, Fire fighting vehicles, Management planning, Allocations, Management information systems, Compilers, Emergency planning.
Identifiers: SIMSCRIPT programming language.

The report describes in nontechnical terms the nature and uses of a computer simulation model of fire department operations. It was written to help fire department administrators and other local government officials understand how the model can be applied to studies of fire department procedures and policies.

PB-242 462/0GA PC$5.75/MF$2.25
Tracor Jitco, Inc., Rockville, Md.
Feasibility Study of In-Vehicle Warning Systems.
Final rept. Jul 73-Mar 75,
D. D. Peterson, and D. S. Boyer. May 75, 148p
DOT-HS-801 569
Contract DOT-HS-256-3-752

Descriptors: *Warning systems, *Motor vehicles, *Accident prevention, Interviews, Utilization, Attitudes, Effectiveness, Intersections, Railroads, Transportation problems, Motor vehicle operators.
Identifiers: DOT/5A, DOT/4DZ/DB.

The study examined the feasibility of various in-vehicle warning systems. The methods used to conduct the study include literature searches, surveys, interviews, and observations. Results of the study indicate that a major cause of accidents between motor vehicles and trains or emergency vehicles is nonreception of a warning by the driver. Nonreception is caused by factors such as acoustically isolated vehicle interiors, lack of driver concentration resulting from stress or fatigue, poor visual scanning patterns, geographical and climatic conditions, and distraction. In-vehicle warning systems (IVWS) have a potential for being an effective countermeasure in over half of the present accidents if system design could provide adequate range, signal clarity, and user confidence. Such characteristics require a technological level beyond a simple transmitter and receiver system.

PB-242 463/8GA PC$5.75/MF$2.25
Wayne State Univ., Detroit, Mich.
Injury Assessment of Belted Cadavers.
Final rept. 25 Jun 73-30 Apr 75,
L. M. Patrick, and R. S. Levine. May 75, 137p
DOT-HS-801 593
Contract DOT-HS-146-3-753

Descriptors: *Injuries, *Motor vehicle accidents, *Collision research, Cadavers, Impact tests, Automobiles, Velocity, Safety belts, Bone fractures, Pathology.
Identifiers: DOT/5A, DOT/4DZ/DB, Biomechanics.

Nine cadavers were subjected to collision simulations in a modified full size automobile with a modified three point harness such as is used in the 1974 automobile. Two cadavers were subjected to a 20 mph barrier equivalent velocity collision; three at 30 mph BEV; and 4 at 40 mph BEV. The injury levels were: AIS-1 at 20 mph; two AIS-3 at 30 mph; and one AIS-3, two AIS-7 and one AIS-8 at 40 mph. The best fit curve through the AIS vs Velocity data indicate that the AIS-3 level is reached at about 34.5 mph. Fatal injuries (AIS-6) are reached at 40 mph. The injuries observed in the unembalmed cadavers are very similar to injuries reported in the literature in accident cases. However, the injuries appear to be more severe and occur with greater frequency at a given collision severity in the cadavers than in the living humans.

PB-242 494/3GA PC$3.25/MF$2.25
Transport and Road Research Lab., Crowthorne (England).
The Hampshire Child Pedestrian Accident Study,
G. B. Grayson. 1975, 16p TRRL-LR-668

Descriptors: *Pedestrian movement, *Children, *Accident investigations, *Motor vehicle accidents, Collision research, Roads, Interviews, Travel patterns, Attention, Great Britain.

A study of accidents involving child pedestrians was carried out in 1972 in conjunction with the Hampshire Constabulary. The study provided more detailed information about accident situations than is normally available through standard reporting procedures. This information covered such items as journey purpose, distance from home, and accompaniment. The reports of the children indicated that in the great majority of cases lack of attention prior to crossing was associated with the accident situation. Inadequate supervision contributed to accidents involving young children.

PB-242 527/0GA PC$5.75/MF$2.25
National Safety Council, Chicago, Ill. Research Dept.
Bicycle Accidents and Usage Among Elementary School Children in the United States.
Final rept.,
Thomas W. Chlapecka, Stuart A. Schupack, Thomas W. Planek, Nancy Klecka, and Gerald J. Driessen. Mar 75, 144p* RD-75-2, 1901-6
Prepared in cooperation with Schwinn Bicycle Co., Chicago, Ill.

Descriptors: *Bicycles, *Accidents, *Children, Traffic safety, Schools, Injuries, Geographic areas, United States.

Information was collected concerning the bicyclist, his bicycle, his use of the bicycle on his last driving day, and accidents that occurred in the past 5 years with emphasis on those in the past 12 months. Accident details were requested for incidents that caused bicycle damage or any injury. The group averaged .48 incidents per year, an estimated annual mileage of 667 miles, and a rate of .72 accidents per 1,000 miles. Inter-relationships were identified between accident details and age, sex, experience, type of bicycle, injury treatment, geographic area, city size, and other pertinent variables. A review of selected studies in bicycle safety is included.

PB-242 739/1GA PC$5.25/MF$2.25
Texas Transportation Inst., College Station.
Vehicle Exteriors and Pedestrian Injury Prevention, Volume IV. Drop Test of Dummies on a Mock Vehicle Exterior.
Final rept. Jul 71-Jul 73,
Hayes E. Ross, Jr., Monroe C. White, Ronald D. Young, and Wayne F. Lammert. May 75, 106p
RF-814-1-Vol-4 DOT-HS-801 544
Contract DOT-HS-065-1-217
See also Volume 3, PB-242 067.

Descriptors: *Pedestrian movement, *Anthropometry, *Motor vehicle accidents, *Collision research, Anatomical models, Impact tests, Injuries, Safety engineering, Automobile bodies.
Identifiers: Vehicle exteriors, DOT/5A, DOT/4DZ/DB.

A series of drop tests were conducted with instrumented anthropometric dummies for data to validate a numerical simulator of the pedestrian accident victim. High-speed cameras recorded dummy kinematics and accelerations were recorded on magnetic tape.

13M. Structural Engineering

AD-A011 224/3GA PC$4.75/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
The Design of a Plastic Structural System (ILIR).
R. G. Merritt. Apr 75, 97p Rept no. CERL-TR-M-121

Descriptors: *Structural members, *Plastics, Structures, Structural properties, Materials, Loads(Forces).
Identifiers: Design.

The report considers the use of plastic materials in the design of new structural systems. It presents a complete design for a 100-man bathhouse to be constructed of plastics. The preliminary design is based upon a uniformly distributed load of 50 lb/sq ft with a safety factor of design. Also included are a material selection scheme for the design of such facilities, a design summary, and a discussion of current methods of testing specimens made of plastic materials.

AD-A011 585/7GA PC$4.75/MF$2.25
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Civil Engineering
SINGER: A Computer Code for General Analysis of Two-Dimensional Reinforced Concrete Structures. Volume 3. User's Guide.
Final rept. Aug 72-Aug 74,
R. J. Melosh, R. M. Barker, and S. M. Holzer.
May 75, 89p AFWL-TR-74-228-Vol-3
Contract F29601-73-C-0022
See also Volume 4, AD-A011 586.

Descriptors: *Structures, *Reinforced concrete, *Blast loads, Joints, Beams(Structural), Stresses, Strain(Mechanics), Finite element analysis, Computerized simulation, User needs, Computer programming, Structural response, Nonlinear systems, FORTRAN.
Identifiers: SINGER computer program.

This document is a user's guide to the SINGER computer program. The guide defines the form and interpretation of input and output data. SINGER predicts the transient response of two dimensional reinforced concrete frames subjected to time varying loadings, accounting for nonlinear material effects and large geometry changes.

AD-A011 586/5GA PC$3.75/MF$2.25
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Civil Engineering
SINGER: A Computer Code for General Analysis of Two-Dimensional Concrete Structures. Volume 4. Demonstration Problems.
Final rept. Aug 72-Aug 74,
R. M. Barker, R. J. Melosh, S. M. Holzer, and J. C. Bradshaw. May 75, 49p AFWL-TR-74-228-Vol-4
Contract F29601-73-C-0022
See also Volume 3, AD-A011 585.

Descriptors: *Structures, *Reinforced concrete, *Blast loads, Joints, Beams(Structural), Stresses, Strain(Mechanics), Finite element analysis, Structural response, Computer programming, Computerized simulation, Nonlinear systems.
Identifiers: SINGER computer program.

This document presents test problems which are intended to demonstrate the ability of SINGER to predict the response of plane frames and rings, including geometrically and physically nonlinear behavior, subject to static and dynamic actions. The following special features are illustrated: Inelastic behavior of a cantilever beam, discretization of an elastic ring under uniform pressure, large deformations of an elastic beam, and inelastic cyclic motion of a rod. The quality of the response predictions by SINGER is assessed on the basis of independent exact or approximate solutions.

COM-75-50260-03/GA PC-GPO/MF$2.25-NTIS
Bureau of Domestic Commerce, Washington, D.C.
Construction Review. Volume 21, Number 3, April 1975.
Monthly industry rept.
Apr 75, 64p
Paper copy available from GPO on subscription or single copy/C41.30/3:21/03.

Descriptors: *Construction, *Reviews, *Construction industry, Expenditures, Housing starts, Residential buildings, Contract awards, Costs, Prices, Construction materials, Employment statistics.
Identifiers: Monthly summaries.

Monthly statistical summaries are given with comparative data for previous years, for private and public housing units by SMSAs, type, and geographic regions; new construction permits; contract awards for federal residential and nonresidential buildings, highways, and housing projects including additions and alterations; indexes of costs, wholesale prices, and union wages; indexes of materials production, shipment,s and stocks; and contract employment by type of contractor. A special feature is presented on innovations in European home ownership policy.

N75-22812/2GA PC$3.75/MF$2.25
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
Laboratory Simulation of an Air-Curtain Roof for the Ontario Science Centre.
A. A. Haasz, B. Etkin, R. T. Lake, and P. L. E. Goering. Feb 75, 26p UTIAS-TN-192
Contract NRC-A-1894

Descriptors: *Air jets, *Flow distribution, *Precipitation (Meteorology), *Wind tunnel tests, Entrainment, Jet nozzles, Mathematical models, Reynolds number, Wind direction.

For abstract, see STAR 1314

N75-22820/5GA PC$3.95/MF$2.25
Aeronautical Research Labs., Melbourne (Australia).
Fatigue of Steel Structures and Structural Steel.
J. Y. Mann. Mar 74, 34p ARL/SM-348

Descriptors: *Fatigue life, *Fracture mechanics, *High strength steels, *Structures, Crack propagation, Load distribution (Forces), Structural design criteria, Tensile strength, Welded joints.

For abstract, see STAR 1314

PB-242 371/3GA PC$7.50/MF$2.25
American Society of Civil Engineers, New York.
Report on a Program Plan for an Experimental R and D Incentives Program in the Construction Industry Proposed for Phase II of a Long Range Program on the Stimulation of Technological Innovation in Civil Engineering and the Construction Industry.
Final rept.,
Donald C. Taylor. Jul 74, 248p NSF/RA/R-74-051
Grant NSF-DI-39521

Descriptors: *Construction industry, *Technology innovation, *Incentives, Industrial research and development, Cost sharing, Federal programs, Government policies, Cooperation, Methodology, Surveys, Organizations, Project planning, Professional associations.
Identifiers: Demonstration projects.

The report covers the development of a plan for a demonstration project designed to test the effectiveness of using a professional society (ASCE) as a catalyst in stimulating non-Federal support of cooperative research for the construction industry. This report was part of a larger effort to examine and test the effectiveness of the Federal cost-sharing incentive mechanism in stimulating the support of cooperative research for traditional, fragmented industries through a variety of non-Federal organizations. The demonstration plan discussed a variety of approaches that would be used to generate support for research and technological innovation, and identified six priority areas of research for cooperative action.

PB-242 404/2GA PC$10.00/MF$2.25
Massachusetts Inst. of Tech., Cambridge.
Proceedings on the M.I.T. Symposium of Strategies for A.I.D. Programs in Selected Areas of Science and Technology. Volume 3. Construction,
Fred Moavenzadeh, and Janet Ann Koch Rossow. Apr 74, 375p
Contract AID/ta-1067
Report on Technology Adaptation Program. See also Volume 2, PB-242 403 and Volume 4, PB-242 405.

Descriptors: *Technology utilization, *Construction industry, *Developing countries, *Meetings, Economic development, Management planning, Structural design, Capital, Labor management relations, Construction materials, Maintenance, Recommendations, Surveys.
Identifiers: Multinational companies.

The report presents a state-of-the-art review of the construction industry in the developing countries. It discusses the role of construction in the process of development and its importance to economic growth, employment creation, and income generation and re-distribution. The report reviews multi-national construction firms as a potential means for the transfer, adaptation, and development of appropriate technologies to less industrialized countries, considering the firms' nature, the scope of their activities, and their evolving role in the development process. Opportunities available to the developing countries for using the multi-nationals as a vehicle for the developmental process and possible incentives for such use are also discussed.

PB-242 426/5GA PC$3.75/MF$2.25
Purdue Univ., Lafayette, Ind. School of Civil Engineering.
Fatigue Behavior of Tall Buildings. Literature Review,
Raymond Yu, A. Ramachandra Rao, and J. T. P. Yao. Apr 75, 39p* CE-STR-75-1
Grant NSF-GK-36196

Descriptors: *Tall buildings, *Wind pressure, Gust loads, Fatigue(Materials), Welded joints, Random vibration, Dynamic loads, Dynamic response.

A survey and study of the current literature related to the possibility of occurrence of wind-induced fatigue problems in modern tall buildings was undertaken, and a summary of the literature is presented. Topics covered in the report include wind load, random vibration of wind-excited building structures, fatigue of metals, fatigue behavior of welded connections and random fatigue.

PB-242 451/3GA PC$4.75/MF$2.25
Swedish Council for Building Research, Stockholm.

Research on Man and His Environment. Problems Discussion.
1975, 80p ISBN-91-540-2343-2, Programme-19b

Descriptors: *Building management, *Construction characteristics, *Environmental issues, Research needs, Problem solving, Management methods, Organization theory, Training programs, Sweden.

This publication describes and analyses the field of environmental research from the points of view of content and organization. The Working Group suggests that the effort should be devoted to problem areas which are essential to planning, production and construction in the light of the needs, requirements and preferences of users.

PB-242 452/1GA PC$3.75/MF$2.25
National Swedish Inst. for Building Research, Stockholm.
Foreign Language Publications on Building in Sweden. 1971-1973.
1974, 36p D4:1974, ISBN-91-540-2374-2
Paper copy also available Svensk Buggtjanst Box 1403, S-111-84 Stockholm, Sweden. SKr. 13.

Descriptors: *Construction, *Construction management, Sweden, Construction industry, Civil engineering, Construction materials, Environmental engineering, Construction costs, Bibliographies.

This document lists articles published on the subject of building in Sweden in English, French and German in books, research reports, periodicals or publication series between 1971 and 1973. (Document D1:197.' National Swedish Building Research, conta a similar list covering the period 1969-1971.) The expression 'Building in Sweden' is interpreted in its widest sense and covers physical planning, design work, construction and management of building, external works and engineering services. The list includes presentations of Swedish building institutions. The material is arranged under 60 subject headings.

PB-242 483/6GA PC$4.75/MF$2.25
Sydney Univ. (Australia). Civil Engineering Labs.
Site Investigation of a Prestressed Concrete Slab - Concrete Strength, Deformation and Other Tolerance Data.
Research rept.,
R. G. Smith, and H. Roper. Feb 75, 96p R-261

Descriptors: *Concrete slabs, *Prestressed concrete, Reinforcing materials, Loads(Forces), Stresses, Creep properties, Shrinkage, Australia.

A study was made of construction tolerances, material behavior and design values of a prestressed concrete slab in Sydney. The design requirement was for a low level of two-way prestress (2.76 MPa) to be applied at an early age (the stressing was performed in stages, the first stressing taking place at 2 days). The design layout of stressing tendons was compared with the actual site profiles.

PB-242 485/1GA PC$3.75/MF$2.25
Sydney Univ. (Australia). Civil Engineering Labs.
Some Considerations on the Application of Partial Prestressing.
Research rept.,
B. J. Westlake. Jan 75, 33p R259

Descriptors: *Structural members, *Prestressing, Beams(Supports), Loads(Forces), Stresses, Cracks, Australia

Many situations arise in the design of prestressed members (especially in buildings) where, when all the operative constraints are taken into account to provide an acceptable behavior for normal loads, it becomes difficult to provide a satisfactory ultimate strength behavior. Such constraints may come in the form of architectural, economic or construction requirements or any of the host of other constraints which may beset the designer. Unsatisfactory ultimate strength behavior would probably manifest itself in either a low load factor or a non-ductile form of failure. This paper describes a technique whereby with the addition of supplementing medium to low strength reinforcement and without the reduction of any prestress force, the ultimate behavior may be improved.

PB-242 499/2GA PC$3.25/MF$2.25
BISRA-The Corporate Labs. of the British Steel Corp., London (England).
Proof Testing Dorman Long Lintels,
J. Blight. Apr 75, 19p BISRA-PROD/MISC/97/74/C

Descriptors: *Beams(Supports), Loads(Forces), Bearing tests, Bearing properties, Great Britain.
Identifiers: *Lintels.

Earlier work, summarized in report GS/PROD/518/74/C, demonstrated that the DL lintels traditionally supplied for domestic and light industrial applications could be replaced by a series of modified light weight lintels. Since then Ayrton Sheet Works, the manufacturers of DL lintels, have decided to produce further modified versions of the shorter span light weight lintels for the domestic market. To demonstrate their load bearing capacities to the requirements of the Agreement Board a series of proof loading tests were conducted. This report discusses the tests, the results and their significance.

PB-242 523/9GA PC$5.75/MF$2.25
California Univ., Berkeley. Div. of Structural Engineering and Structural Mechanics.
Structural Behavior of a Curved Two Span Reinforced Concrete Box Girder Bridge Model. Volume I. Design, Construction, Instrumentation and Loading.
Final rept.,
A. C. Scordelis, J. G. Bouwkamp, and P. K. Larsen. Sep 74, 137p UCSESM-74-5
Prepared in cooperation with California State Business and Transportation Agency, Sacramento. See also Volume 2, PB-242 524.
Paper copy also available in set of 3 reports as PB-242 522-SET, PC$24.00.

Descriptors: *Girder bridges, *Curved beams, *Reinforced concrete, Structural analysis, Structural design, Construction, Instrumentation, Loads(Forces), Models.
Identifiers: DOT/4CZ/CB.

This is the first of a three volume sequence as follows: Vol. 1 - Design, Construction, Instrumentation and Loading; Vol. 2 - Reduction, Analysis and Interpretation of Results; and Vol. 3 - Detailed Tables of Experimental and Analytical Results. In the present volume a detailed study of the instrumentation, construction and testing of a large scale, horizontally curved, two span, four cell, reinforced concrete box girder bridge model is presented. The selection of the model scale, the choice and location of instrumentation, and the system of data acquisition are discussed.

PB-242 524/7GA PC$9.50/MF$2.25
California Univ., Berkeley. Div. of Structural Engineering and Structural Mechanics.
Structural Behavior of a Curved Two Span Reinforced Concrete Box Girder Bridge Model. Volume II. Reduction, Analysis and Interpretation of Results.
Final rept.,
A. C. Scordelis, J. G. Bouwkamp, and P. K. Larsen. Sep 74, 339p UCSESM-74-6
Prepared in cooperation with California State Business and Transportation Agency, Sacramento. See also Volume 1, PB-242 523, and Volume 3, PB-242 525.
Paper copy also available in set of 3 reports as PB-242 522-SET, PC$24.00.

Descriptors: *Girder bridges, *Curved beams, *Reinforced concrete, Structural analysis, Structural design, Instrumentation, Loads(Forces), Data reduction, Models.
Identifiers: DOT/4CZ/CB.

This is the second of a three volume sequence as follows: Vol. 1 - Design, Construction, Instrumentation and Loading; Vol. 2 - Reduction, Analysis and Interpretation of Results; and Vol. 3 - Detailed Tables of Experimental and Analytical Results. In the present volume of a detailed presentation of the reduction, analysis and interpretaion of the experimental and theoretical results obtained in testing a large scale, horizontally curved, two span, four cell, reinforced concrete box girder bridge model is given. The various computer programs used in obtaining theoretical results are described and compared. The methods and computer programs used for reduction of experimental data are also presented.

PB-242 525/4GA PC$11.50/MF$2.25
California Univ., Berkeley. Div. of Structural Engineering and Structural Mechanics.
Structural Behavior of a Curved Two Span Reinforced Concrete Box Girder Bridge Model. Volume III. Detailed Tables of Experimental and Analytical Results.
Final rept.,
A. C. Scordelis, J. G. Bouwkamp, and P. K. Larsen. Sep 74, 452p UCSESM-74-7
Prepared in cooperation with California State Business and Transportation Agency, Sacramento. See also Volume 2, PB-242 524.
Paper copy also available in set of 3 reports as PB-242 522-SET, PC$24.00.

Descriptors: *Girder bridges, *Curved beams, *Reinforced concrete, Structural analysis, Structural design, Instrumentation, Data processing, Loads(Forces), Models.
Identifiers: DOT/4CZ/CB.

This is the third of a three volume sequence as follows: Vol. 1 - Design, Construction, Instrumentation and Loading; Vol. 2 - Reduction, Analysis and Interpretation of Results; and Vol. 3 - Detailed Tables and Experimental and Analytical Results. In the present volume detailed tables of experimental and analytical results obtained in testing a large scale, horizontally curved, two span, four cell, reinforced concrete box girder bridge model are presented. Results in terms of reactions, deflections, strains and moments are given. The responses of the bridge to point loads, conditioning loads and truck loadings all at working stress levels are tabulated. In addition, tabulated results are given for conditioning loads at overstress levels and for point loads after conditioning overloads.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A011 218/5GA PC$6.75/MF$2.25
Army Electronics Command White Sands Missile Range N Mex Atmospheric Sciences Lab

Satellite Calibration Data. Annual Data Report - 1974.
Technical rept.,
L. Edwin Williamson. May 75, 66p Rept no. ECOM-DR-75-1

Descriptors: *Data acquisition, *Calibration, *Meteorological satellites, Detectors.

The report contains data from weekly observations of meteorological and radiative parameters at selected satellite calibration target sites. These sites include the highly reflective gypsum field in southcentral New Mexico and a dark lava surface nearby. The report also includes narrative descriptions of the instruments in use at the target sites.

AD-A011 229/2GA PC$3.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Advanced Sensors Directorate
Tri-Plane Elevated Evaluation System.
Technical rept.,
Donald G. Smith, and Earle Smaltz. 9 May 75, 17p Rept no. RE-75-26

Descriptors: *Target drones, *Test facilities, *Towers, Target angle, Manipulators, Acoustic insulation, Instrumentation, Remote control.
Identifiers: MQM-34 drones, MQM-34D drones, Firebee.

A new test facility has been constructed in Test Area No. 1 at the US Army Missile Command, Redstone Arsenal, Alabama. This test facility provides a three-axis platform atop a 150-foot tower for evaluating any device not exceeding 1000 pounds in weight. This facility consists of three major elements: the 150-foot tower which includes an anechoic upper portion, a remote controlled three-axis position manipulator, and control instrumentation and true position calculating equipment.

AD-A011 248/2GA PC$3.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Continuous Monitoring of Total Dissolved Gases in Natural Waters. A Feasibility Study,
Thomas F. Jenkins. May 75, 14p Rept no. CRREL-SR-231

Descriptors: *Monitors, Nitrogen, Oxygen, Prototypes, Gases, Water, Dissolving, Gas detectors, Field tests.
Identifiers: *Dissolved gases, *Water analysis, Strippers.

A preliminary investigation was undertaken to determine if a monitoring device capable of unattended operation could be configured to continuously measure total dissolved gases in natural waters. A three-component system was designed consisting of a pumping system, a continuous gas stripper, and a detector. Prototypes of the first two components were assembled and evaluated under field conditions. Based upon these results, it is possible to configure a monitor capable of unattended operation for continuous measurement of total dissolved gas concentrations in natural waters.

AD-A011 286/2GA PC$3.25/MF$2.25
TRW Inc Philadelphia Pa
Production Engineering Measure for Thin Film Ratiometer.
Quarterly progress rept. no. 7, 1 Jan-31 Mar 75,
Harry B. Casey. 18 Apr 75, 24p
Contract DAAB05-73-C-2077
See also report dated 31 Dec 74, AD-A007 249.

Descriptors: *Measuring instruments, Manufacturing, Production engineering, Thin films, Specifications, Test methods.
Identifiers: Ratiometers, *Production engineering measures, Photoresist techniques.

The purpose of this Production Engineering Measure is to develop an optimized production process for the manufacture of Thin Film Ratiometers. During this quarter, work continued on the Pilot Production phase of the contract. The Pilot Production testing program was started. A special report on Temperature-Humidity Testing was completed and delivered. An improved ceramic substrate design was developed, and prototype quantity ordered.

AD-A011 313/4GA PC$4.25/MF$2.25
Denver Univ Colo Dept of Physics and Astronomy
Construction of a Balloon-Borne RF Quadrupole Mass Spectrometer Package.
Final rept. 7 Dec 72-31 Aug 74,
David G. Murcray, and Robert C. Amme. Jun 75, 65p BRL-CR-235
Contract DAAD05-73-C-0139

Descriptors: *Mass spectrometers, *Atmospheric sounding, *Balloon equipment, Ultraviolet radiation, Performance(Engineering), Stratosphere, Radiofrequency, Experimental design, Radiometers, Cosmic rays, Gas analysis.
Identifiers: *Quadrupole mass spectrometers, Atmospheric composition.

A balloon-borne, radio-frequency mass spectrometer was constructed under this contract. The package is designed to study the ambient positive ion and more abundant neutral molecules of the upper stratosphere. The range of the mass spectrometer is 1 to 150 amu, with a resolution which can be set to better than 1 amu over that range. Titanium sublimation is used to pump the bulk of the gas load, with assistance from a liquid helium CO2 frost pump.

AD-A011 339/9GA PC$3.25/MF$2.25
Army Tank-Automotive Command Warren Mich
A Mobile Laboratory for Data Acquisition and Processing.
Final rept.,
C. Douglas Houston, Jr. Jan 75, 17p Rept no. TACOM-TR-11996

Descriptors: *Data acquisition, Instrumentation, Mobile, Laboratories, Telemeter systems, Field tests, Telemetering data.

A Mobile Instrument Laboratory is described, which was designed, fabricated, and placed into operation by TACOM. The purpose of this facility is to enable efficient measurement of any field data that may be important from the viewpoint of analyzing and evaluating the adequacy of the design of a vehicle or its components. Important performance features in this system include the climination of the need for a wire-connected pacing vehicle and onboard real-time monitoring of data during magnetic tape recording. On-site calibration and repair capability are also provided. This Mobile Laboratory may be taken to almost any location at any time to acquire data on complete vehicle or any of their components for subsequent simulator testing or analysis. Setup time for the measurement equipment is reduced to a minimum through the use of a cable patch system. In addition, the Mobile Laboratory may be connected into the fixed station laboratories to augment their capacity during periods of excessive workloads.

AD-A011 344/9GA PC$3.75/MF$2.25
General Radio Co Concord Mass
Tracking Servobridge Detector.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 74,
H. P. Stratemeyer. 31 Mar 74, 50p
Contract DAAB05-73-C-0609

Descriptors: *Detectors, Tracking, Servoamplifiers, Intermediate frequency amplifiers, Power amplifiers, Frequency multipliers, Electric bridges, Production engineering.

The object of the study is to establish production engineering measures to be undertaken for the parts, materials and processes used in fabricating tracking servobridge detectors; and to establish the producibility of that item by mass production techniques and with mass production facilities; establish a quality control system; and take such actions as necessary to reduce the time required for delivery of the subject items that will be required in large quantity production for current planning and in the event of an emergency. The report summarizes the work on the Tracking Servobridge Detector during the third quarter of the contract. It includes test results of the I.F. Amplifier, Power Amplifier and X10 Frequency Multiplier phase noise. Design considerations are discussed for the Isolation Modules, Power Supply and Sweep and Servo Amplifier Module.

AD-A011 366/2GA PC$3.25/MF$2.25
Raven Industries Inc Sioux Falls S Dak Flight Operations Dept
Electric Balloon Timer. Part No. 070-0156-001.
Technical rept.
1974, 11p
Contract N00014-74-C-0339

Descriptors: *Timing devices, Balloons, Airborne, Electronic equipment, Power supplies, Integrated circuits.

The timer is composed of two units; the timer proper and a control unit. The timer proper with self-contained batteries is housed in a 3 in. x 3 in. x 7 in. aluminum enclosure. It needs only a styrofoam outer insulation barrier and may be mounted anywhere on the balloon flight train. A pigtail connector from the timer proper must be mated to the timer control unit. This allows the operator to preset the desired time delays. The timer control unit also contains the time display and a switchable fast self check feature.

AD-A011 604/6GA PC$4.25/MF$2.25
Air Force Inst of Tech Wright-Patterson AFB Ohio School of Engineering
Dynamic Behavior of Angle-of-Attack Vane Assemblies.
Final rept.,
James T. Karam, Jr. Dec 74, 61p Rept no. AFIT-TR-74-8

Descriptors: *Aerodynamic configurations, *Air flow, *Instrumentation, Angles, Directional, Booms(Equipment), Errors, Damping, Flight testing, Mathematical models, Wind tunnel tests, Comparison, Test methods, Dynamics, Gusts, Angle of attack, Flat plate models.
Identifiers: *Flow direction indicators, Angle of attack vanes.

A relatively simple analytic model was developed for predicting the dynamic behavior of angle-of-attack vane assemblies in response to changes in the free stream direction and/or to transverse motions of the vane's pivot axis. Experimental tests of a typical vane were performed in five-foot, low subsonic wind tunnel. Comparisons were made of the model's predictions with these tests and with other test results found in the literature. Viscous and tip effects were not included in the model. Viscous and tip effects were not included in the model. The aerodynamic damping was experimentally found to be essentially independent of airspeed as predicted, but the model's estimates were only within a factor of 2 to 3 of the data. It was found that typical aircraft instrumentation boom motions may lead to significant errors in the apparent angle of attack.

COM-75-10690/6GA PC$4.75/MF$2.25
National Bureau of Standards, Washington, D.C.

Improved Ultrasonic Standard Reference Blocks.
Interim rept. 1 Jan 74-31 Dec 74,
D. G. Eitzen, G. F. Sushinsky, D. J. Chwirut, C. J. Behtoldt, and A. W. Ruff. Apr 75, 84p NBSIR-75-685
Contract F33615-74-M-6752
Sponsored in part by National Aeronautics and Space Administration, Washington, D.C., and Army Materials and Mechanics Research Center, Watertown, Mass.

Descriptors: *Standards, *Ultrasonic tests, Nondestructive tests, Aluminum alloys, Steel, Titanium alloys, Fabrication, Computer programs.
Identifiers: Standard reference blocks.

A program to improve the quality, reproducibility and reliability of nondestructive testing through the development of improved ASTM-type ultrasonic reference standards is described. Reference blocks of aluminum, steel, and titanium alloys are to be considered. Equipment representing the state-of-the-art in laboratory and field ultrasonic equipment was obtained and evaluated. RF and spectral data on ten sets of ultrasonic reference blocks have been taken as part of a task to quantify the variability in response from nominally identical blocks. Techniques for residual stress, preferred orientation, and micro-structural measurements were refined and are applied to a reference block rejected by the manufacturer during fabrication in order to evaluate the effect of metallurgical condition on block response. New fabrication techniques for reference blocks are discussed and ASTM activities are summarized.

COM-75-10692/2GA PC$19.25/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Materials Research.
Standard Reference Materials and Meaningful Measurements.
Special pub. (Final),
Richard W. Seward. Mar 75, 821p* NBS-SP-408
Proceedings of the Materials Research Symposium (6th), Gaithersburg, Md., 29 Oct 73-2 Nov 73. Library of Congress Catalog Card no. 75-1207.
Paper copy also available from GPO as C13.10:408.

Descriptors: *Measurement, *Standards, *Meetings, Chemical analysis, Physical properties.
Identifiers: *Standard reference materials, Certification, Scientific research.

This book presents the proceedings of the 6th Materials Research Symposium on 'Standard Reference Materials and Meaningful Measurement' held at the National Bureau of Standards, Gaithersburg, Maryland, on October 29 through November 2, 1973. The symposium was sponsored by the NBS Institute for Materials Research. The purpose of the symposium was to explore ways that Standard Reference Materials (SRM's) could be used more effectively to bring about meaningful measurements both on a national and international scale, to explore the meaning of meaningful measurements, and to review the major paths now used to reach these measurements. Starting with the relationship of SRM's to a national measurement system, the symposium reviewed SRM activities at the international level, various national programs, and industrial needs. The use of statistics, selection criteria, and steps for certifying SRM's were reviewed. Fifteen panel sessions reviewed the current status of SRM's and outlined future needs.

COM-75-10817/5GA PC$3.25/MF$2.25
National Bureau of Standards, Washington, D.C. Electronic Technology Div.
Development of a Dynamic Pressure Calibration Technique.
Progress rept. 15 Feb-15 Aug 74,
Carol F. Vezzetti, John S. Hilten, and Paul S. Lederer. 5 Jun 75, 21p NBSIR-75-708
Contract NASA-L-88319
See also report dated 15 Oct 73, COM-74-10974.

Descriptors: *Pressure sensors, *Calibrating, Transducers, Dynamic pressure, Amplitude, Vibrators(Machinery), Tubes, Technology development, Liquids, Research projects.
Identifiers: Sinusoidal variations, *Sinusoidal calibrators, Poly(oxy(silylene/dimethyl)), Liquid columns.

The report deals with work continuing on the development of a method of producing sinusoidally varying pressures of at least 34 kPa zero-to-peak with amplitude variations within plus or minus 5% up to 2 kHz for the dynamic calibration of pressure transducers. Sinusoidally varying pressures of 34 kPa zero-to-peak have been produced, to date, between 40 Hz and 750 Hz by vibrating a 10-cm column of a dimethyl siloxane liquid at 36gn zero-to-peak. Damping of the liquid column was accomplished by packing the fixture tube with a number of smaller diameter tubes.

COM-75-50321/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
A New Form for the Third-Order Asymptotic Aberration Coefficients of Electrostatic Lenses; Application to the Two-Tube Electrostatic Lens.
Final rept.,
D. DiChio, S. V. Natali, and C. E. Kuyatt. Jan 75, 6p
Pub. in Review of Scientific Instruments, v46 n1 p71-76 Jan 75.

Descriptors: *Electron lenses, *Electrostatic lenses, Aberrations, Integrals, Coefficients.
Identifiers: Reprints.

The third-order asymptotic aberration coefficients of round electrostatic lenses are reformulated in terms of the coordinates formed by the projections of the asymptotic incident and final rays onto the reference plane of the lens. In this formulation, all aberration coefficients are finite for all lenses, in contrast to the formulation in terms of coordinates projected onto the focal planes of the lenses, where all of the coefficients become infinite in the limit of very weak lenses and for certain strong lenses. Equations for the six third-order aberration coefficients are derived in the form of integrals involving derivatives of the axial potential no higher than the second. Using these equations and previously calculated potentials and first-order trajectories, the authors have computed the six aberration coefficients for the accelerating and decelerating two-tube electrostatic lens for voltage ratios from 1.1 to 10000. The results are believed accurate to better than 0.2%.

COM-75-50334/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Rapport sur la Comparaison Internationale des Mesures de Permittivite Complexe a 9 GHz (International Comparison of Complex Permittivity Measurement at 9 GHz).
Final rept.,
H. E. Bussey. Oct 72, 13p
Text in French.
Pub. in Proceedings of Comite Consultatif, d'Electricite Comite International des Poids et Mesures, Sevres, France, 12-13 Oct 72, p124-137 1972.

Descriptors: *Dielectric properties, Measurement, Microwave frequencies.
Identifiers: Reprints.

Dielectric constant and loss measurements made by three national laboratories (of the USSR, Canada, and USA) are compared. The two materials measured were glasses. The measurements used cavity resonators in the H sub 01n mode. The errors in dielectric constant reported by the laboratories were usually plus or minus 0.3%; actual differences between laboratories of the average corrected results were only plus or minus 0.05%. The loss tangent results disagreed when multimoding occurred; however, the errors may be as low as plus or minus 0.000 02 or plus or minus 3%, whichever is the larger, if multimoding is avoided.

COM-75-50338/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
An Application of the Power Equation Concept and Automation Techniques to Precision Bolometer Unit Calibration.
Final rept.,
Ernest L. Komarek. Jun 74, 3p
Pub. in Proceedings of 1974 IEEE S-MTT International Microwave Symposium, Atlanta, Ga., 12-14 Jun 74, Paper in Microwave Symposium Digest, p263-265 Jun 74.

Descriptors: *Bolometers, Calibrating.
Identifiers: Reprints.

The power equation concept has been implemented into a multioctave precision bolometer unit calibration system employing automation techniques in conjunction with an automatic network analyzer system. The system was qualified as a calibration transfer system operating in the 2-12.4 GHz frequency range at 1 to 10 mW with a single measurement standard deviation of 0.2% to 1% from 2-10 GHz.

COM-75-50350/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Measurement of Geometrically Total Spectral Radiant Power.
Final rept.,
Kshitij Mohan, A. Russell Schaefer, and Edward F. Zalewski. Apr 75, 4p
Pub. in Applied Optics, v14 n4 p1035-1038 Apr 75.

Descriptors: *Light(Visible radiation), Power spectra, Standards, Goniometers, Measuring instruments, Silicon, Photodiodes, Optical filters.
Identifiers: Reprints.

The measurement of geometrically total spectral radiant power, i.e., the spectral radiant power emanating in all directions from a light source, is discussed. A gonioradiometer employing a silicon photodiode and a set of narrow band interference filters was used for these measurements. The experiment is described, some exploratory measurements are presented, and the uncertainties which this method introduces are estimated.

COM-75-50354/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Future Growth of SEM - Toward Super Efficient Microscopy.
Interim rept.,
H. Yakowitz. 1975, 10p
Sponsored in part by Advanced Research Projects Agency, Arlington, Va.
Pub. in Proceedings of Annual Scanning Electron Microscope Symposium (8th), St. Louis, Mo., 7-11 Apr 75, pt1 p1-10 Apr 75.

Descriptors: *Electron microscopy, Auger electron spectroscopy, Electron probes.
Identifiers: Reprints, *Scanning electron microscopy, Electron spectroscopy, Scientific research.

Some predictions concerning future trends in the SEM field have been made. Economic and personnel considerations have been taken into account in arriving at these predictions. Micrographic and analytical requirements and capabilities were also considered. For electron transparent specimens, scanning transmission electron microscopy (STEM) will become a major research method. Auger and energy loss spectrometry will join x-ray emission as analytical methods used for the analysis of such samples. Greater advantages will probably arise from improvments in electron source brightness and from advantages afforded by low energy loss electron detectors. Finally, the SEM field can only profit as the quality and quantity of educational opportunities in the field expand.

COM-75-50357/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Spectral-Absorptance Measurements for Laser Calorimetry.
Final rept.,
E. D. West, and L. B. Schmidt. May 75, 6p
Pub. in Jnl. of the Optical Society of America, v65 n5 p573-578 May 75.

Descriptors: *Laser beams, *Heat measurement, *Power measurement, Absorbance, Temperature, Radiometry.
Identifiers: *Laser heating, Reprints.

Methods used at the National Bureau of Standards for determining the power or energy in laser beams depend on calorimetric comparison of laser power or energy and the calibrating electrical power or energy. For this comparison, it is essential to know the fraction of the incident radiant energy that is converted to heat and measured by the calorimeter. This fraction, the effective spectral absorptance, is measured by adding an auxiliary calorimeter, which covers practically all of the opening in the main calorimeter. A laser beam enters the main calorimeter through a small hole in the auxiliary calorimeter. The reflected laser energy and the excess thermal radiation are measured by the auxiliary calorimeter. The data analysis is based on the theory of calorimetry derived from a linear heat-flow problem. Time-dependent functions relating the transient temperature responses of the calorimeters to various constant power inputs are determined experimentally from known electrical inputs. The effective absorptance is found by comparing transient responses for electrical and laser inputs.

COM-75-50378/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Magnetic Domain Structures in Fe-3.2Si Revealed by Scanning Electron Microscopy - A Photo Essay.
Final rept.,
H. Yakowitz, and D. E. Newbury. 1975, 4p
Pub. in Jnl. of Testing and Evaluation, v3 n1 p75-78 Jan 75.

Descriptors: *Iron alloys, *Magnetic domains, Silicon containing alloys, Magnetic anisotropy, Stresses, Strain, Contrast.
Identifiers: Iron alloy 3.2Si, Scanning electron microscopy, Reprints.

The mechanism and experimental arrangement by which magnetic contrast can be observed from materials of cubic anisotropy are indicated. Transformer alloy, Fe-3.2 w/o Si is used as an example to illustrate the effects of tensile strain, magnetic field switching, residual stress and inclusions on magnetic structure.

COM-75-50381/3GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Tracking, Pulsed Ultrasonic Interferometer.
Final rept.,
William T. Angel, and Vern E. Bean. May 75, 3p
Pub. in Review of Scientific Instruments, v46 n5 p533-535 May 75.

Descriptors: *Interferometers, *Ultrasonic radiation.
Identifiers: Reprints.

A pulsed ultrasonic interferometer was designed and constructed that has the ability to track changes in transit time as the ambient pressure and temperature of the sample are changed. The stability over 17 h approached one part in 10 to the 7th power. This instrumentation will be incorporated into an automated high pressure transfer standard calibration system.

COM-75-50384/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
NBS-CGA Cryogenic Flow Measurement Program.
Final rept.,
J. A. Brennan, R. W. Stokes, C. H. Kneebone, and D. B. Mann. 1974, 13p
Sponsored in part by The Compressed Gas Assoc., Inc., New York, N.Y.
Pub. in Proceedings of ISA International Instrumentation-Automation Conference and Exhibit, New York, N.Y. 28-31 Oct 74. Paper in Advances in Instrumentation, v29 p612-1/612-13 1974.

Descriptors: *Flowmeters, *Liquid nitrogen, Cryogenic technology, Transferring, Standards, Tests, Densitometers, Temperature measurement, Experimental data.
Identifiers: Reprints.

This paper reviews the joint National Bureau of Standards-Compressed Gas Association program in which (1) all the types of flowmeters used in the U.S. for custody transfer of liquid nitrogen were tested, (2) a tentative national code on cryogenic liquid-measuring devices was adopted, (3) use of transfer standards for testing cryogenic flowmeters was started, and (4) tests on some temperature and density compensation devices were completed. Data from the test program are presented in summary form for flowmeters operating on several principles. Highlights of the code requirements and transfer standard test results are described. Densitometer and temperature compensation test data are presented.

N75-22291/9GA PC$3.25/MF$2.25
European Space Research Organization, Paris (France).
Problems Relating to Wind Tunnel Simulation of Relaxing Flows.
K. Robert. Feb 75, 24p ESRO-TT-135, DLR-FB-74-31
Tran-Transl. Into English of "Zur Problematik der Simulation Relaxierender Stroemungen im Windkanal" Dfvlr, Porz, West Ger. Report Dlr-FB-74-31, 17 Apr. 1974. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 12.60 Dm.

Descriptors: *Flight simulation, *Free flight, Computation, Hypersonic wind tunnels, Iteration, Three dimensional flow, Viscous flow.

For abstract, see STAR 1314

N75-22337/0GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Real-Time Computer Data System for the 40-by 80-Foot Wind Tunnel Facility at Ames Research Center.
J. M. Cambra, and G. P. Tolari. May 75, 39p
NASA-TN-D-7970, A-5751
Subm-Prepared in Cooperation with Informatics, Inc., Palo Alto, Calif.

Descriptors: *Design analysis, *Operating systems (Computers), *Real time operation, *Wind tunnel tests, Aerodynamics, Data acquisition, Data links, Data processing equipment, Human factors engineering, Wind tunnels.

For abstract, see STAR 1314

N75-22374/3GA PC$6.25/MF$2.25
British Aircraft Corp. (Operating) Ltd., Bristol (England).
Solid-Backed Thermopiles Technology Development.
Final Report on Phase 2.
E. M. N. Baldwin, L. Callard, M. Cole, and J. Dalgliesh. Nov 74, 160p ESRO-CR-216
Contract ESTEC-1392/71-TIAA

Descriptors: *Environmental tests, *Thermopiles, Bismuth tellurides, European space programs, Goe satellites, Horizon scanners, Manufacturing, Semiconducting films, Thermoelectric materials, Thin films.

For abstract, see STAR 1314

N75-22485/7GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
Reproducibility of Liquid Oxygen Impact Test Results.
J. B. Gayle. May 75, 8p NASA-TN-D-7905

Descriptors: *Impact tests, *Liquid oxygen, Drop tests, Free fall, Liquefied gases, Statistical analysis.

For abstract, see STAR 1314

N75-22546/6GA PC$3.75/MF$2.25
Laboratoire de Recherches Balistiques et Aerodynamiques, Vernon (France). Service Aerodynamique.
Pressure Rise in the R4 Vacuum Chamber Montee en Pression du Caisson a Vide de R4.
F. Kauba, and A. Desgardin. 28 Nov 74, 40p
LRBA-E-1024-PV-14/SAE
Contract SNIAS-3359-3013
Language in French.

Descriptors: *Ejectors, *Gas injection, *Suction, *Time dependence, *Vacuum chambers, Cold gas, Initiation, Pressure effects.

For abstract, see STAR 1314

N75-22684/5GA PC$3.75/MF$2.25
Beckman Instruments, Inc., Anaheim, Calif.
Preliminary Flight Prototype Silver Ion Monitoring System, Addendum.
Final Report.
R. I. Wilson. Mar 75, 46p NASA-CR-141785, FR-2687-101A
Contract NAS9-13387

Descriptors: *Ion selective electrodes, *Prototypes, *Silver bromides, Fabrication, Monitors, Sensors, Space shuttles.

For abstract, see STAR 1314

N75-22691/0GA PC$3.75/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Method and Apparatus for the Electric Measurement of Physical Value, for Example, Measurement of Mechanical Stresses.
J. G. Yates. May 75, 27p NASA-TT-F-16318
Contract NASW-2483
Tran-Transl. Into English from German Patent No. 837476, 19 May 1949 15 p.

Descriptors: *Electrical measurement, *Measuring instruments, *Propellers, *Shock loads, *Stress measurement, Bolometers, Magnetometers, Mechanical properties, Mechanical shock, Moisture meters, Thermometers.

For abstract, see STAR 1314

N75-22704/1GA PC$3.25/MF$2.25
Royal Armament Research and Development Establishment, Fort Halstead (England).
A Further Investigation into the Effects of Scattered Radiation Upon Image Sharpness and Contrast, Using Cobalt-60 gamma Radiation and Steel Plates in the Thickness Range 3 to 100MM.
M. Dowd, and R. Halmshaw. Nov 74, 21p
RARDE-MEMO-161/74, BR44026

Descriptors: *Image contrast, *Radiation effects, Cobalt 60, Electromagnetic scattering, Gamma rays, Metal plates, Optical density, Steels.

For abstract, see STAR 1314

N75-23245/4GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Ultrasonic Displacement System.
N. D. Faulcon. 21 Apr 75, 15p NASA-TM-X-72687

Descriptors: *Oscillations, *Plates (Structural members), *Remote sensors, *Ultrasonics, Demodulation, Doppler effect, Frequency modulation.

For abstract, see STAR 1314

N75-23355/1GA PC$3.25/MF$2.25
Office National d'Etudes et de Recherches Aerospatiales, Toulouse (France). Dept. d'Etudes et de Recherches en Technologie Spatiale.
Perfection of a Quartz Monitor. A Carousal System for Semiindustrial Production of Uniform Thin Films: Application to D5a Solar Absorbers Mise au Point d'UN Ensemble Balance a Quartz. Systeme a Carrousel pour la Fabrication Semiindustrielle de Couches Minces Uniformes: Application a D5a - Absorbeurs Solaires.
M. Soulet. Nov 74, 19p ONERA-DERTS-NT-04-3 Language in French.

Descriptors: *Production engineering, *Quartz crystals, *Solar energy absorbers, *Thermal control coatings, *Thin films, Adhesion, Film thickness, French satellites, Frequency shift, Homogeneity, Optical thickness, Reproduction, Vacuum deposition.

For abstract, see STAR 1314

PAT-APPL-473 251/GA PC$3.25/MF$2.25
Department of the Navy Washington D C
Distributed Temperature Sensor.
Patent Application,
Tibor G. Horwath. Filed 24 May 74, 20p Rept no.

Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Temperature measuring instruments, Patents, Detectors, Temperature, Temperature sensitive elements.
Identifiers: *Patent applications, PAT-CL-73-362.

The patent application describes a distributed temperature sensor, in the form of a coaxial cable terminated in its characteristic impedance, comprising: an inner metallic conductor; a cylindrical, flexible, nonconductive material, surrounding the metallic conductor, having a plurality of axial voids extending throughout the length of the cable; a temperature-sensitve dielectric filling the axial voids, the voids being plugged at each end; an outer conductor surrounding the nonconductive material; and an optional elastomeric jacket surrounding the outer conductor. The invention also relates to apparatus for taking a continuous readout of a distributed temperature field, using the coaxial cable as a key element.

PAT-APPL-509 596/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Spiral Manometer.
Patent Application,
Roy V. Baker. Filed 26 Sep 74, 9p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Manometers, *Patent applications, Spiral wrapping, Pressure gages, Pressure measurement, Gas flow, Liquid flow, Reservoirs, Glass, Tubing and fittings.
Identifiers: *Spiral manometers, Inclined manometers.

The patent application is for a new apparatus for measuring fluid (liquid and gas) pressure. This apparatus consists of a uniquely constructed manometer wherein the inclined leg member comprises a transparent tubing spirally wound around a vertical cylinder which is mounted on a flat round horizontal base plate. The vertical cylinder contains an internally affixed fluid reservoir. The flat round horizontal base plate comprises a system of vertical leveling screws and a leveling bubble for alignment.

PAT-APPL-563 513/GA PC$3.25/MF$2.25
Department of Health, Education, and Welfare, Washington, D.C.
Density Gradient Fractionation by Piston Displacement.
Patent Application,
D. H. Coombs. Filed 31 Mar 75, 20p DHEW-G-116-74
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Patent applications, *Pistons, *Centrifuging, *Separation, Displacement, Density(Mass/volume), Gradients.

The patent application describes a method and apparatus for the fractionation of centrifuged density gradients. The apparatus consists of a gradient holder composed of a transparent and an opaque section which contains an opening allowing a centrifuged tube containing a density gradient having individual bands to be inserted into the holder. A displaceable piston which is suspended above the holder and is connected to an actuator may be raised or lowered into the density gradient. A standard illuminating device is placed under the gradient holder so that the exact position of each individual band can be determined. Once the precise location is determined, the displaceable piston is lowered into the gradient and by operating the actuator, the desired band of gradient can be extracted. Additionally, this method may be used in a continuous fractionation of the entire gradient.

PAT-APPL-565 289/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Method and Apparatus for Measuring Web Material Wound on a Reel.
Patent Application.
R. M. Muller. Filed 4 Apr 75, 22p NASA-CASE-GSC-11902-1
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Measuring instruments, *Reels, *Webs (Sheets), Circumferences, Digital integrators, Interpolation, *Patent applications, Tachometers, Thickness.

Method and apparatus for measuring the number of layers of a web material of known thickness wound on a storage or take-up reel were developed based on the principle that, at a relatively large radius, the loci of layers of a thin web wound on the reel approximate a family of concentric circles having radii respectively successively increasing by a length equal to the web thickness, t. The difference in circumferences between adjacent web layers is substantially constant and equal to 2 Pi t. Tachometer pulses are generated in response to linear movement of the web and reset pulses are generated in response to rotation of the reel. A digital circuit, responsive to the tachometer and reset pulses, generates data indicative of the layer number of any layer of the web and of position of the web within the layer without requiring numerical interpolation.

PAT-APPL-574 219/GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Pasadena Office, Calif.
High Resolution Fourier Interferometer-Spectrophotopolarimeter.
Patent Application.
A. L. Fymat. Filed 5 May 75, 32p NASA-CASE-NPO-13604-1
Contract NAS7-100
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *High resolution, *Interferometers, *Spectrophotometers, Light scattering, *Patent applications, Polarization (Waves), Stokes law of radiation.

A Fourier spectropolarimeter was designed for use in a laboratory in determining high-resolution spectra of the four Stokes' parameters, providing the intensity and complete state of polarization of light reflected from, and transmitted through a scattering sample in a cell. A single linear polarizer-analyzer of variable orientation, and specially arranged mirrors is used. The mirrors are employed to switch between modes using three mirrors in each mode. Mirrors are paired for compensated (zero net) polarizing effect between them, and the third one introduces the same uncompensated polarizing effect in all three modes. The polarization interferograms can be recorded with the spectral resolution provided by the interferometer.

PB-241 848/1GA PC$3.25/MF$2.25
Transit Development Corp., Washington, D.C.
Metric Conversion and the Transit Industry.
Final rept.,
David R. Phelps. Jun 74, 11p TDC/500-74/5

Descriptors: *Metric system, Conversion, Units of measurement, Commercial transportation, Mass transportation.
Identifiers: International System of Units.

The mass transit industry will be affected by the transition to the metric system and must plan for it. The potential effects of metric conversion on the transit industry are discussed based on an assessment of the most probable course of action to be followed as an advocacy of metric conversion.

PB-242 275/6GA PC$4.25/MF$2.25
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Investigation of a Grid Induced Turbulent Environment for Wind Tunnel Testing.
Partial rept. Jan 73-Dec 74,
T. A. Reinhold, H. W. Tieleman, and F. J. Maher. Dec 74, 60p VPI-E-74-30

Grant NSF-GK-35801

Descriptors: *Subsonic wind tunnels, *Wind pressure, *Dynamic structural analysis, Buildings, Turbulent flow, Intensity, Velocity, Fourier transformation, Mathematical models, Model tests, Power spectra, Equations of motion, Scale(Ratio), Atmospheric motion, Suspension bridges.
Identifiers: Grids(Structural), Smooth flow.

Engineers have long been concerned about the effects of natural winds on structures. However, most modeling schemes have involved wind tunnel testing under smooth flow conditions. Recently, investigators have attempted to simulate the turbulence of natural winds in wind tunnel tests. In performing a wind tunnel model test of a two-dimensional nature, a grid constructed of 3.6 x 0.75 inch boards on 18 inch centers was used at the entrance of the tunnel. Use of the resulting turbulent flow to simulate atmospheric turbulent flows for testing sectional models of suspension bridges is discussed.

14C. Recording Devices

AD-A011 618/6GA PC$3.25/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Acceptance Inspection for Audio Cassette Recorders.
Technical rept.,
Edgar A. Smith. Dec 74, 11p Rept no. AFHRL-TR-74-101

Descriptors: *Acceptability, *Training devices, *Recording systems, Reliability, Inspection, Cassettes, Audiovisual aids, Facilities, Learning, Media.

The technical memorandum describes a series of inspections for cassette recorders that can be performed to assure that the devices are acceptable. The inspections can be completed in 20 minutes and can be performed by instructional personnel. The series of inspection procedures includes tests of the intelligibility of audio, physical condition, tape speed, impulse reliability, response range and torque delivered to the tape. It is suggested that acceptance testing could both avoid disruption of instruction and save money by obtaining repair or replacement under the warranty on the device.

14D. Reliability

AD-A011 238/3GA PC$3.75/MF$2.25
Army Materiel Systems Analysis Agency Aberdeen Proving Ground Md
Research Study of Reliability Prediction of Mechanical and Structural Systems. Volume I. R and M Prediction in Engineering Development.
Special publication,
W. Frank Richmond, Jr. Mar 75, 29p Rept no. AMSAA-SP-19-Vol-1
Errata sheet inserted. See also Volume 2, AD-A011 239.

Descriptors: *Reliability, *Maintainability, *Statistical analysis, Mathematical prediction, Failure, Engineering, Risk, Systems analysis.
Identifiers: Statistical inference.

Valid predictions of R and M (Reliability and Maintainability) should be based on design processes as the true determinants. Failure to do this and to develop the necessary data has resulted from lack of understanding and liaison between analysts and designers. The first corrective step should be development of a data base, initially from design testing, then from better instrumentation of R and M testing, using design, instrumentation, and data systems skills. Design-oriented failure-mode analysis and maintainability analysis are necessary for data classification. Proper use of the data for prediction depends upon an improved understanding and liaison between analysts and designers.

AD-A011 239/1GA PC$3.75/MF$2.25
Delaware Univ Newark
Research Study of Reliability Prediction of Mechanical and Structural Systems. Volume II.
Final rept.,
Robert M. Stark, and Cheng Yi Yang. May 72, 44p AMSAA-SP-19-Vol-2
Contract DAAD05-70-C-0011
See also Volume 1, AD-A011 238.

Descriptors: *Structural members, *Stresses, *Reliability, Statistical analysis, Failure, Mechanical engineering, Systems analysis.

This study was intended to assess the state-of-the-art of predicting the reliability of items that fail due to mechanical stresses, and to identify those areas in which development effort should be intensified. In order to achieve an orientation toward application rather than analytical theories, a sample approach has been chosen by AMSAA, the details of the sample being selected by consultation between AMSAA and the University of Delaware. The study revealed a dearth of design-oriented data on mechanical failures and a virtual absence of analytical methods and expertise to use such data. Development of a data base is recommended, initially from design testing. This experience and its result will provide a basis of analytical expertise to use the data for reliability prediction.

14E. Reprography

AD-A011 327/4GA PC$3.25/MF$2.25
Arizona State Univ Tempe Dept of Electrical Engineering
Holography of Submerged Objects,
J. C. Palais, J. Biemer, and I. Kaufman. 1 Apr 74, 5p AFOSR-TR-75-0784
Contract F44620-69-C-0025
Availability: Pub. in Jnl. of Applied Physics, v45 n8 p3516-3520 Aug 74.

Descriptors: *Holograms, *Continuous wave lasers, Underwater objects, Opacity, Diffusivity, Target angle, Surface waves, Water waves, Excitation, Oscillation, Interference, Reprints.

Holograms of diffuse opaque objects which are submerged in water are difficult to obtain using a cw laser if the object is to be viewed from the top of the container. Experiments and theory are described which indicate that the major cause of the problem is excitation of unstable surface waves. When the object and container are on a stabilized table suitable for normal holography, these waves are excited by small residual oscillations of the table. Surface wave amplitudes can be of sufficient height and frequency to ruin the hologram. A simple solution to this problem is presented. (Author)

AD-A011 394/4GA PC$5.75/MF$2.25
Auburn Univ Ala Engineering Experiment Station
A High-Speed Recording System for Holography Using Acousto-Optic Light Deflection.
Final rept. 1 Feb 74-31 Jan 75,
R. L. Battiste, W. F. Ranson, and W. F. Swinson. 31 Mar 75, 126p Rept no. ER-RF-75603-01 ARO-12126.1-RTL
Grant DAHC04-74-G-0107

Descriptors: *Holography, *High speed cameras, *Lasers, *Acoustooptics, Photoelasticity, Test equipment, Ruby lasers, Lght transmission, Nondestructive testing.
Identifiers: Interferometric holography.

A high-speed camera system has been designed and developed for use in holography. The specific applications are to be used in the area of experimental photomechanics especially in transmitted photoelasticity. The system was tested to determine its application to high speed recording with a pulse ruby laser. Multiple holograms were recorded on a single film. The characteristics exhibited by the camera and the high quality of the holograms indicated that the camera system has the potential to become a useful tool in dynamic photomechanics.

N75-22685/2GA PC$3.25/MF$2.25
Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.
Test Procedure for Hasselblad Field Irradiance.
C. George. Apr 75, 20p NASA-CR-141776, LEC-5968
Contract NAS9-12200

Descriptors: *Cameras, *Photographic film, Photometers, Photomultiplier tubes, Scanning, X-y plotters.

For abstract, see STAR 1314

N75-22690/2GA PC$3.75/MF$2.25
Technicolor Graphic Services, Inc., Houston, Tex.
Black-and-White Separations of Spacecraft Original Film.
L. Perry. Mar 75, 30p NASA-CR-141777, JSC-09622
Contract NAS9-11500

Descriptors: *Black and white photography, *Photographic film, *Spaceborne photography, Photographic emulsions, Photographic equipment.

For abstract, see STAR 1314

15. MILITARY SCIENCES

15C. Defense

AD-A011 134/4GA PC$7.00/MF$2.25
Stanford Research Inst Menlo Park Calif Facilities and Housing Research Dept
Evaluation of Existing Structures.
Final rept.,
C. K. Wiehle. Dec 74, 195p
Contract DAHC20-71-C-0292

Descriptors: *Housing(Dwellings), *Nuclear explosions, *Blast loads, *Computer programs, Nuclear explosion damage, Reinforced concrete, Basements, Walls, Dynamic response, Computerized simulation, Civil defense, FORTRAN.
Identifiers: CDC 6400 computers.

The objective of the overall research program is to develop an evaluation procedure applicable to existing NSS-type structures and private homes. Past efforts have been concerned with examining exterior walls; window glass; steel frame connections; applications to actual buildings; reinforced concrete floor systems, including restrained slabs; wood-joist floors; and the dynamic inelastic analysis of a steel frame building. Since this is the final report in this effort, a summary of the evaluation procedure for existing structures is presented in the report. Also included is the flow chart developed for a computer program to analyze a building subsystem; i.e., the dynamic response and collapse of all exterior and interior walls on one floor level oof a building.

AD-A011 184/9GA PC$5.25/MF$2.25
Army War Coll Carlisle Barracks Pa

United States--United Europe--1980s.
Individual research project,
James D. Chandler, and Kenneth L. Peek, Jr. 28 May 74, 110p

Descriptors: *NATO, Policies, Military strategy, Defense planning, Deterrence, USSR, United States government, Western Europe.

Contents: The evolution of NATO strategy; The need for NATO; United States objectives in Western Europe; US/Western European policy environment; US/Western European anomalies (The Soviet threat, US nuclear shield); A new Atlantic alliance; Independent and credible European nuclear deterrent; MBFR; NATO's flanks--Northern Europe and Southern Europe; The interim period (1975-1980); Short term risks--political and military; Proposals to minimize military risks; Can Europe afford its own nuclear deterrent.

AD-A011 216/9GA PC$3.75/MF$2.25
Westinghouse Electric Corp Falls Church Va Center for Advanced Studies and Analyses
Identification and Measurement of U.S. Interests Abroad: A Quantitative Analysis of U.S. Stakes at the Subtheater Level and Their Relative Vulnerability to Local Conflict. Executive summary,
Jan S. Breemer, and Peter H. Fenn. Nov 74, 27p
Contract MDA903-74-C-0223, ARPA Order-2667

Descriptors: *Defense planning, Military strategy, Political science, Geographic areas, Conflict, Threat evaluation, Resources, Manpower, Deployment, Protection, Data bases.

The study has two main objectives: first, to develop a systematic means for rank-ordering foreign countries on the basis of a series of explicit, quantifiable measures of the U.S. interest abroad, and, secondly, to provide a preliminary statement of the relative level of threat that U.S. subtheater interests may be exposed to as the result of local inter-state conflict.

AD-A011 226/8GA PC$5.25/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Facility Simulation Model for Advanced BMD Systems. Volume IIIB. Structural Module: Program Reference Manual.
Final rept.,
A. Kao, R. Blackmon, and E. McDowell. Apr 75, 113p Rept no. CERL-TR-C-28-Vol-3B
See also Volume 3A, AD-A009 747, and Volume 3C, AD-A010 713.

Descriptors: *Antimissile defense systems, *Hardened structures, *Computerized simulation, Structural response, Radiation shielding, Underground structures, Guided missile silos, Blast loads, Ground motion, User needs, Computer programming, Cost estimates.

This structural module volume is divided into a user's manual, a program reference manual, and a program listing. In this program reference manual, structural module design procedures are described, along with loading functions and radioactive shielding. Cost estimates and outrunning ground motion are outlined for a shock isolation program. Computer program descriptions are given for the five related structural modeles -- aboveground, belowground, dome, silo, and shock isolation.

AD-A011 227/6GA PC$4.25/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Facility Simulation Model for Advanced BMD Systems. Volume IVA. Power Module: User's Manual.
Final rept.,
A. Kao, R. Blackmon, D. Eng, and E. McDowell. Apr 75, 53p Rept no. CERL-TR-C-28-Vol-4A
See also Volume 3C, AD-A010 713, and Volume 4B, AD-A009 748.

Descriptors: *Antimissile defense systems, *Hardened structures, *Power supplies, *Computerized simulation, Diesel engines, Gas turbines, Fuel cells, Electric batteries, Turbogenerators, Alternators, FORTRAN, User needs.

This Power Module Volume is divided into a user's manual, a program reference manual, and a program listing. In this user's manual, input formats are outlined for each power system: diesel engine, gas-turbine engine, turbo-alternator, fuel cells, and batteries. The module calculates the performance characteristics of each system and also selects commercially available power systems from a data base for both diesel and gas-turbine to meet the power output requirements. Five sample problems, one for each power system, illustrate the use of the Power Module.

AD-A011 231/8GA MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Facility Simulation Model for Advanced BMD Systems. Volume IVC. Power Module: Program Listing.
Final rept.,
A. Kao, R. Blackmon, E. McDowell, and D. Eng. Apr 75, 45p Rept no. CERL-TR-C-28-Vol-4C
See also Volume 4B, AD-A009 748.
Availability: Available in microfiche only.

Descriptors: *Antimissile defense systems, *Hardened structures, *Power supplies, *Computerized simulation, Diesel engines, Gas turbines, Fuel cells, Electric batteries, Turbogenerators, Alternators, FORTRAN, Computer programs.
Identifiers: POWERM computer program.

This Power Module volume is divided into a user's manual, a program reference manual, and a program listing. In this program listing, the FORTRAN program of one program in the Power Module is documented. This is Program POWERM.

AD-A011 232/6GA MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Facility Simulation Model for Advanced BMD Systems. Volume VC. HVAC/PC Module: Program Listing.
Final rept.,
A. Kao, R. Blackmon, and E. McDowell. Apr 75, 180p Rept no. CERL-TR-C-28-Vol-5C
See also Volume 5B, AD-A010 715.
Availability: Available in microfiche only.

Descriptors: *Antimissile defense systems, *Hardened structures, *Computerized simulation, Heating, Ventilation, Air conditioning equipment, Underground facilities, Underground structures, Blast loads, Dynamic response, User needs, Computer programs.
Identifiers: *Process cooling systems.

This HVAC/PC Module volume is divided into a user's manual, a program reference manual, and a program listing. In this program listing, the FORTRAN programs of three programs in the HVAC/PC Module are documented. These three programs are MAIN1 (HVAC1), HVAC2, and RSPNSR.

AD-A011 235/9GA PC$3.25/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Facility Simulation Model for Advanced BMD Systems. Volume VIII. Operational Manual.
Final rept.,
A. Kao, R. Blackmon, and E. McDowell. Apr 75, 20p Rept no. CERL-TR-C-28-Vol-8
See also Volume 6, AD-A010 632.

Descriptors: *Antimissile defense systems, *Hardened structures, *Computerized simulation, Heating, Ventilation, Air conditioning equipment, Underground facilities, Underground structures, Power equipment, FORTRAN, Control sequences, User needs, Computer programming.
Identifiers: FORTRAN 4 programming language.

This Operational Manual is the last of eight volumes of the Facility Simulation Model study. It describes the control cards required for operating the model.

AD-A011 278/9GA PC$7.00/MF$2.25
Oklahoma State Univ Stillwater Office of Engineering Research
A Computer Aided Statistical Covariance Program for Missile System Analysis.
Final rept.,
James R. Rowland, and V. M. Gupta. 1 Apr 74, 195p
Contract DAAH01-72-C-0672

Descriptors: *Antimissile defense systems, *Noise analyzers, *Computer programs, *Statistical analysis, Covariance, Monte Carlo method, Degrees of freedom, Computerized simulation, Algorithms, Mathematical models.
Identifiers: Six degree of freedom.

A combined Monte Carlo-direct covariance algorithm digital computer software package has been developed and tested for determining the effects of noise disturbances on large-scale missile systems. The combined software package was applied to a thirty-third order math model of a six degree-of-freedom air defense missile system. The large-scale system was composed of a fifteenth-order (15th) autopilot, a fourth-order (4th) actuator subsystem, a twelfth-order (12th) airframe, and a second-order (2nd) seeker. A basic statistical covariance program involving incremental variations about noise-free operating conditions was developed during the first year to calculate the effects of noise propagation for missile systems up to approximately 25th order.

AD-A011 403/3GA PC$5.75/MF$2.25
Westinghouse Electric Corp Falls Church Va Center for Advanced Studies and Analyses
Identification and Measurement of U.S. Interests Abroad: A Quantitative Analysis of U.S. Stakes at the Sub-Theater Level and Their Relative Vulnerability to Local Conflicts.
Final technical rept.,
Jan S. Breemer, and Peter H. Fenn. Nov 74, 145p
Contract MDA903-74-C-0223, ARPA Order-2667
See also AD-A011 216.

Descriptors: *Defense planning, Military strategy, Political science, Geographic areas, Conflict, Threat evaluation, Resources, Manpower, Deployment, Protection, Data bases.

This is volume 2 of the study to develop a systematic means for rank-ordering foreign countries on the basis of U.S. interest abroad. Six independent dimensions of the U.S. stake at the subtheater level were delineated, and ninety-three (93) countries were rank-ordered on each, as well as across an aggregate measure of all six. The same set of countries were evaluated in terms of the relative level of local, inter-state conflict behavior they had experienced over the period 1961-1973. The severity of thirteen years of conflict was measured with the help of a conflict continuum scale consisting of twenty-three generic types of conflict-interaction. Annual conflict scores were aggregated into a series of final, weighted conflict intensity indices for 1973. Country interest scores were juxtaposed with the pertinent conflict intensity indices in a display of ranked levels of U.S. security concern.

15E. Logistics

AD-A011 136/9GA PC$4.25/MF$2.25
Army Materiel Command Alexandria Va
Joint Design-to-Cost Guide. A Conceptual Approach for Major Weapon System Acquisition.
3 Oct 73, 58p Rept no. AMCP-700-6
Also available as Rept. no. AFLCP/AFSCP-800-19.

Descriptors: *Military procurement, *Weapon systems, *Cost analysis, *Logistics planning, Joint military activities, Department of Defense, Contracts, Cost estimates, Policies.
Identifiers: *Logistics management, Life cycle costing, *Design to cost.

The purpose of the document is to provide guidance and assistance in the implementation of Design-to-Cost concepts. Its basic intent is to identify what should be done with only a general approach of how to do it. The concepts provided are based on the best available information on Design-to-Cost. The evolution of the concept in DOD is in its early phases. It is anticipated that considerable development and changes in Design-to-Cost concepts and practices may occur as experience is gained. The guide answers the following questions on Design-to-Cost. Why Design-to-Cost. What is it. To what programs should Design-to-Cost be applied and when. Further, the document provides basic guidance for a Design-to-Cost effort and describes how Design-to-Cost goals are established and approved.

AD-A011 140/1GA PC$8.50/MF$2.25
Defense Supply Agency Alexandria Va Office of the Assistant Director Plans Programs and Systems
Compendium of Inventory Control Point Management Information. Volume I. Management Data.
Nov 74, 273p
See also Volume 2, AD-A011 141.

Descriptors: *Inventory control, *Management information systems, *Management planning and control, Management engineering, Data bases, Operation, Cost analysis, Efficiency, Performance, Materiel, Procurement, Work elements, Air Force, Marine Corps, Army, Navy, Military supplies, Logistics support, Policies.
Identifiers: *Inventory management, *Inventory Control Points, Operating costs, Logistics management.

The study develops a data base that will enable top management in the DoD to compare ICP primary operating costs and evaluate the relative efficiency of each ICP in the performance of materiel management functions. The study collects ICP management data which portrays the ICPs' mission and functions; organization, organizational relationships, and location; size; personnel authorizations; workload; productivity; resource allocation and consumption; unit costs; performance; and goals, standards, and objectives. The ICP management data are then analyzed to determine compatibility and comparability; and to identify causal relationships which exist between workload, resources, and performance. The data are presented in a manner which will facilitate its review and analysis by the Office of the Secretary of Defense.

AD-A011 141/9GA PC$5.25/MF$2.25
Defense Supply Agency Alexandria Va Office of the Assistant Director Plans Programs and Systems
Compendium of Inventory Control Point Management Information. Volume II. Appendices.
Nov 74, 105p
See also Volume 1, AD-A011 140.

Descriptors: *Inventory control, *Management information systems, *Management planning and control, Management engineering, Data bases, Operation, Cost analysis, Efficiency, Performance, Materiel, Procurement, Work elements, Air Force, Marine Corps, Army, Navy, Military supplies, Logistics support, Policies.
Identifiers: *Inventory management, *Inventory Control Points, Operating costs, Logistics management.

The purpose of the study is to develop a data base that will enable top management in the DoD to compare ICP primary operating costs and evaluate the relative efficiency of each ICP in the performance of materiel management functions.

AD-A011 163/3GA PC$3.25/MF$2.25
California Univ Los Angeles Western Management Science Inst
A Guide to Computer-Assisted Methods for Distribution Systems Planning.
Arthur M. Geoffrion. 1974, 29p Rept no. WMSI Reprint-129
Availability: Pub. in Sloan Management Review, v16 n2 p17-41 Winter 75.

Descriptors: *Logistics planning, Computer aided instruction, Supplies, Management engineering, Distribution, Linear programming, Integer programming, Reprints.

Every firm that ships a variety of products from several plants (or other supply sources) through a number of warehouses (or distribution centers) to a widely dispersed clientele has a continuing need to monitor and readjust its distribution system in response to changing conditions. The purpose here is to provide a nontechnical guide to the evaluation of available computer-assisted approaches and models for distribution system planning.

AD-A011 185/6GA PC$4.25/MF$2.25
Army Procurement Research Office Fort Lee Va
Cost Growth: Effects of Share Ratio and Range of Incentive Effectiveness.
Final rept.,
Robert L. Launer. Jul 74, 56p Rept no. PRO-007-4

Descriptors: *Cost analysis, *Government procurement, *Army procurement, Logistics planning, Cost estimates, Statistical analysis.
Identifiers: *Cost growth, Cost overruns, Cost underruns.

This report addresses cost growth problems that have been experienced with CPIF contracts in the Army Materiel Command, especially those problems related to the incentive structure itself. The data base is composed of 53 randomly selected CPIF contracts completed between 1964 and 1971 with initial proce of %500,000 or more. The important major findings are that: (a) The use of the most probable cost for target costs (directed by ASPR) as opposed to expected cost, produces about 20 percent contract cost growth. (b) There is a positive correlation between contractor's share of underrun and contractual adjustments and a negative correlation between overrun and the contractor's share for overruns. (c) The contractor's share of underrun and overrun is less than the negotiated share, on the average, while his profit for final costs which are above the upper limit of the range of incentive effectiveness is occasionally far greater than the negotiated minimum profit.

AD-A011 186/4GA PC$4.25/MF$2.25
Army Procurement Research Office Fort Lee Va
The Design to Unit Production Cost (DTUPC): Range of Applicability to Development Procurements.
Final rept.,
Kimrey D. Newlin, and Shirley H. Carter. Oct 74, 70p Rept no. PRO-304

Descriptors: *Cost analysis, *Government procurement, *Army procurement, Scientific research, Weapon systems, Logistics planning, Contracts.
Identifiers: *Design to cost, *Design to unit production cost, Benefit cost analysis.

The merits of Design to Unit Production Cost (DTUPC) as a method of procurement are currently being heralded by the Department of Defense and Army. The goal of lower acquisition costs is very appealing. To date only a few contracts which have incorporated DTUPC have been awarded and only limited experience exists at this point in time. The purpose of this study was to determine the applicability of DTUPC to AMC development procurements. The findings of this study indicate that DTUPC provisions should not be applied to development procurements if contract value does not exceed $1 million or projected production contract values do not $4 million.

AD-A011 188/0GA PC$3.75/MF$2.25
Army Procurement Research Office Fort Lee Va
Proposal Evaluation in NonMajor Procurements.
Final rept.,
Robert F. Williams, and Richard D. Heuermann. Dec 74, 50p Rept no. PRO-203

Descriptors: *Government procurement, *Contract administration, Costs, Management planning and control, Life cycles, Logistics planning, Army procurement.
Identifiers: Prices.

Proposal evaluations for nonmajor systems procurements do not receive the procedural guidance and procurement managerial attention commensurate with their resource consumption and logistics importance. This study analyzes present procedures, needs, and problems and sets forth conclusions and recommendations for improving procedures for proposal evaluation planning, structuring the solicitation, and conducting proposal evaluations in nonmajor procurements where multiple-award factors are to determine the source selection.

AD-A011 189/8GA PC$4.75/MF$2.25
Army Procurement Research Office Fort Lee Va
Improved Management of GOCO Plants Through Contract Provisions.
Final rept.,
Keith A. Ulrich. Mar 75, 96p Rept no. APRO-305

Descriptors: *Government procurement, *Industrial plants, *Management, *Contracts, Costs, Ammunition, Logistics support.
Identifiers: *Government owned contractor operated plants.

The study reviews the nature of GOCO(Government Owned Contractor Operated) contracting, factors which inhibit the development and application of effective solutions, and ARMCOM's efforts to improve GOCO contracting. The study analyzes the major problem areas of GOCO contracting, namely, the instability of requirements, inappropriate contractual arrangements, and 'funds control' as opposed to 'cost control.' The study concludes that improved management of GOCO plants through contract provisions is viable only insofar as the contract provisions serve as a vehicle for achieving better management; contract provisions cannot function as substitutes for active management. Recognizing that changes to the current GOCO contracting philosophy are not apt to occur, partial remedies are suggested as a means of improving the management of GOCO plant and motivating GOCO contractors within, for the

most part, the existing GOCO contracting philosophy.

AD-A011 220/1GA PC$4.25/MF$2.25
Army Procurement Research Office Fort Lee Va
Improvement of Army Materiel Command Procurement Policy Procedures.
Final rept.,
Rachel C. Lilley, Robert J. Walker, and Charles A. Correia. Feb 75, 53p Rept no. APRO-402

Descriptors: *Army procurement, Policies, Efficiency, Decision making, Logistics planning.

This report concerns the present procurement policy promulgation system in use at Headquarters, Army Materiel Command (AMC) and throughout AMC's major subordinate commands (MSC). Research was conducted at three primary levels: (1) HQ, AMC Directorate level; (2) MSC Procurement Policy office level; and (3) the MSC operational level (e.g., contracting officers, contract negotiators, procurement analysts, etc.). A statistical analysis of a representative sample of personnel at this third level is made to determine whether or not the present system is satisfactorily meeting functional needs. The study objectives are to analyze the present system of procurement policy promulgation; determine the validity of allegations made against the system; and identify those areas in the system contributing to its being less than optimally effective. Based on the analysis and subsequent conclusions, recommendations directed toward the system's improvement are made.

AD-A011 221/9GA PC$4.75/MF$2.25
Army Procurement Research Office Fort Lee Va
Allocating Corporate G and A Expenses and Establishing Fee/Profit for GOCO Contracts.
Final rept.,
Keith A. Ulrich. Mar 75, 87p Rept no. APRO-210

Descriptors: *Government procurement, *Industrial plants, *Contracts, Costs, Profits, Allocations.
Identifiers: *Government owned contractor operated plants, Fees, Expenses.

It is the Army's practice not to recognize corporate G and A expenses on cost-reimbursable contracts for Government-owned, contractor-operated (GOCO) ammunition plants. Since, in some cases, GOCO contractors may be absorbing corporate G and A expenses in their fees, the problem of allocating and absorbing G and A costs on GOCO contracts becomes entwined with profit policy. This study provides a comprehensive analysis of policy considerations in allocating corporate G and A expenses and establishing fees on GOCO contracts. Recommended methods for handling corporate G and A expenses and fee/profit on GOCO ammunition contracts are provided in the study.

AD-A011 233/4GA PC$6.25/MF$2.25
Army Procurement Research Office Fort Lee Va
Procurement Research Resources/Sources.
Final rept.,
Monte G. Norton, and Keith A. Ulrich. Apr 75, 155p Rept no. APRO-505

Descriptors: *Government procurement, Scientific research,, Logistics planning, Management planning and control, Matrices(Mathematics).

In response to a two-fold need in the procurement research community this study presents a resources matrix and an annotated sources guide. The resources matrix identifies procurement research activities that have a demonstrated capability in specific procurement research areas; the annotated sources guide combines and describes basic procurement information sources as an aid to performing procurement research, including staff studies. This project was conducted with the intent that the resources matrix will be employed primarily as a management tool while the sources guide would serve primarily as a research aid.

AD-A011 234/2GA PC$5.25/MF$2.25
Army Procurement Research Office Fort Lee Va
An Analysis of the Army's Procurement of Non-personal Contractual Services with Emphasis on Housekeeping Services.
Final rept.,
Richard D. Heuermann, and Harold F. Candy. Dec 74, 111p Rept no. APRO-209

Descriptors: *Army procurement, *Contracts, Kitchens, Cleaning, Maintenance, Costs.
Identifiers: Housekeeping services.

This report concerns the need for the Department of the Army to have a better knowledge of the effectiveness of its services contracting practices and procedures. The objectives of the study were to analyze the organizational structure and methods used by Army procurement offices in procurement of nonpersonal contractual services and then to determine what changes, if any, should be made to existing organizations and methods. Recommendations are made in the report for improvement in methods and training and for changes in the organization to effectively accomplish the procurement mission.

AD-A011 245/8GA PC$4.75/MF$2.25
Army Test and Evaluation Command Aberdeen Proving Ground Md Deputy Chief of Staff for Analysis
AVSCOM'S Spare Parts Breakout Study.
Technical rept.,
Mark E. Barkeley, and Alan R. LeMay. Jun 75, 92p Rept no. AMSAV-D-75-4 USAAVSCOM-TR-75-20

Descriptors: *Army aircraft, *Spare parts, *Logistics planning, Questionnaires, Logistics support, Army aviation, Savings, Inventory control.
Identifiers: *Logistics management.

The report is delimited to the AVSCOM Spare Parts Breakout Program, with materiel considerations being restricted to those items which are on the demand stockage list (DSL), authorized stockage list (ASL), and select others. The objectives of the study are the following: Evaluate the current practices and procedures of the Spare Parts Breakout Program for areas of improvement; determine whether potential resource savings can be realized from the Spare Parts Breakout Program.

AD-A011 246/6GA PC$3.75/MF$2.25
Army Aviation Systems Command St Louis Mo Systems Analysis Office
US Army Aircraft Peacetime Replacement Factors.
Technical rept.,
Frank W. Ross, and Alan R. LeMay. Jun 75, 38p Rept no. AMSAV-D-75-1 USAAVSCOM-TR-74-55

Descriptors: *Army aircraft, *Replacement, Replacement theory, Predictions, Regression analysis, Forecasting, Inventory.

The Study conducts a definitive analysis of the procedure for computing aircraft peacetime replacement factors (PTRFs) given in AR 710-60 (9 Jan 73) and suggests an appropriate alternative. Multiple regression analysis is used to develop predictive equations which relate aircraft losses to various characteristics of the Army aircraft systems. Portions of the report are to be used in forecasting future aircraft peacetime losses.

AD-A011 378/7GA PC$15.25/MF$2.25
Department of Defense Washington D C
Defense Use of Certain Federal Property: Atlanta Area Army, March-April 1972.
1972, 689p

Descriptors: *Military facilities, *Army, *Military reserves, *Georgia, National Guard, Warehouses, Depots, Research facilities, Buildings.
Identifiers: National Guard armories, Atlanta(Georgia).

The report consists of check list data sheets which describe the Defense use of Active service facilities, Reserve facilities and other Army property holdings. Portions of this document are not fully legible.

AD-A011 503/0GA PC$5.75/MF$2.25
Assistant Secretary of Defense (Manpower and Reserve Affairs) Washington D C
Study of Military Commissary Stores. Volume I.
Final rept.,
Emmett W. Bowers. May 75, 147p
See also Volume 2, AD-A011 504.

Descriptors: *Department of Defense, *Military facilities, *Stores, *Systems engineering, Efficiency, Organizations, Operation, Costs, Management engineering, Logistics planning, Army, Navy, Air Force, Marine Corps.
Identifiers: *Commissaries, Logistics management.

The study examines the current organization and operation of commissary stores within the Army, Navy, Marine Corps and Air Force, and evaluates alternative methods for improving their efficiency, organization and operating structure. The study was conducted in response to a directive of the Assistant Secretary of Defense (Manpower and Reserve Affairs). Analysis and evaluation of alternative methods of operation are included within the study, along with recommendations to the ASOD (M and RA) as to future operation of commissary resale stores. The report is contained in two volumes.

AD-A011 504/8GA PC$10.25/MF$2.25
Assistant Secretary of Defense (Manpower and Reserve Affairs) Washington D C
Study of Military Commissary Stores. Volume II.
Final rept.,
Emmett W. Bowers. May 75, 382p
See also Volume 1, AD-A011 503.

Descriptors: *Department of Defense, *Military facilities, *Stores, *Systems engineering, Efficiency, Operation, Management engineering, Costs, Logistics planning, Army, Navy, Air Force, Marine Corps.
Identifiers: *Commissaries, Logistics management.

Contents:
- Present service commissary systems;
- Potential areas for improvement of existing systems;
- Centralized separate service commissary systems;
- Consolidation of commissary systems with existing exchange systems;
- Joint service commissary store agency;
- Civil service personnel considerations.

AD-A011 643/4GA PC$4.25/MF$2.25
Rand Corp Santa Monica Calif
Estimating Life-Cycle Costs: A Case Study of the A-7D,
Marco Fiorello. Feb 75, 71p Rept no. R-1518-PR Contract F44620-73-C-0011

Descriptors: *Air Force procurement, *Attack aircraft, *Cost analysis, *Logistics planning, Acquisition, Forecasting, Cost estimates, Weapon systems.
Identifiers: *Life cycle costing, A-7 aircraft, A-7D aircraft, Logistics management, Force structure planning.

The report is concerned with the determination of costs incurred in acquiring and owning a weapon system and the data problems associated therewith. Incurred or historical costs can be used to anticipate future costs of operations and support, to compare forecast with incurred costs for evaluating forecasting techniques, or to estimate a weapon system's total life cycle costs (LCC) for use, along with the associated weapon system capability, in force structure planning. The principal objective of the study is to demonstrate the derivation of the life-cycle cost.

15F. Nuclear Warfare

AD-A011 435/5GA PC$10.50/MF$2.25
National Military Command System Support Center Washington D C
The NMCSSC Quick-Reacting General War Gaming System (QUICK) Program Maintenance Manual. Volume IV, Sortie Generation Subsystem, Part 2.
Computer system manual,
Richard L. Page, Angelo M. Pellicciotto, and Dale J. Sanders. 1 Jun 74, 412p Rept no. NMCSSC-CSM-mm-9-74-vol-4-pt-2
See also Volume 4 Part 1, AD-A011 497, and Volume 5 Part 1, AD-A011 498.

Descriptors: *Nuclear warfare, *War games, *Computer programming, Computerized simulation, Strategic warfare, Antimissile defense systems, Antiaircraft defense systems, Allocations, Instruction manuals, FORTRAN.
Identifiers: QUICK(Quick Reacting General War Gaming System), Quick reacting general war gaming system.

The NMCSSC Quick-Reacting General War Gaming System (QUICK) is used to generate missile and bomber plans suitable for strategic war gaming, and to simulate execution of the planned events. This is one of five volumes describing the computer programming specifications for the Quick-Reacting General War Gaming System (QUICK). This volume addresses programs of the QUICK Sortie Generation Subsystem, and is intended to serve as the basis for program maintenance activities.

AD-A011 436/3GA PC$12.25/MF$2.25
National Military Command System Support Center Washington D C
The NMCSSC QUICK-Reacting General War Gaming System (QUICK) Program Maintenance Manual. Volume III. Weapon Allocation Subsystem. Part 1.
Computer system manual,
Richard L. Page, Angelo M. Pellicciotto, and Dale J. Sanders. 1 Jun 74, 503p Rept no. NMCSSC-CSM-mm-9-74-vol-3-pt-1
See also Volume 1, Part 1, AD-A009 323, and Volume 4 Part 1, AD-A011 497.

Descriptors: *Nuclear warfare, *War games, *Computer programming, Computerized simulation, Strategic warfare, Antimissile defense systems, Antiaircraft defense systems, Allocations, FORTRAN, Instruction manuals.
Identifiers: QUICK(Quick Reacting General War Gaming System), Quick reacting general war gaming system.

The computerized Quick-Reacting General War Gaming System (QUICK) will accept input data, automatically generate global strategic nuclear war plans, simulate the planned events, and provide statistical output summaries. QUICK has been programmed in FORTRAN for use on the NMCSSC HIS 6080 computer system. This volume, Volume III, provides the programmer/analyst with a technical description of the purpose, functions, general procedures, and programming techniques applicable to the programs of the Weapon Allocation subsystem and to the utility programs/routines which support the system.

AD-A011 497/5GA PC$9.50/MF$2.25
National Military Command System Support Center Washington D C
The NMCSSC QUICK-Reacting General War Gaming System (QUICK) Program Maintenance Manual. Volume IV. Sortie Generation Subsystem, Part 1.
Computer system manual,
Richard L. Page, Angelo M. Pellicciotto, and Dale J. Sanders. 1 Jun 74, 343p Rept no. NMCSSC-CSM-mm-9-74-vol-4-pt-1
See also Volume 3 Part 1, AD-A011 436, and Volume 4 Part 2, AD-A011 435.

Descriptors: *Nuclear warfare, *War games, *Computer programming, Computerized simulation, Strategic warfare, Antimissile defense systems, Antiaircraft defense systems, Allocations, FORTRAN, Instruction manuals.
Identifiers: QUICK(Quick Reacting General War Gaming System), Quick reacting general war gaming system.

The computerized Quick-Reacting General War Gaming System (QUICK) will accept input data, automatically generate global strategic nuclear war plans, simulate the planned events, and provide statistical output summaries. QUICK has been programmed in FORTRAN for use on the NMCSSC HIS 6080 computer system. The QUICK Program Maintenance Manual consists of five volumes. This volume, Volume IV, provides the programmer/analyst with a technical description of the purpose, functions, general procedures, and programming techniques applicable to the program and subroutines of the Sortie Generation subsystem.

AD-A011 498/3GA PC$10.00/MF$2.25
National Military Command System Support Center Washington D C
The NMCSSC QUICK-Reacting General War Gaming System (QUICK) Program Maintenance Manual. Volume V, Simulation Subsystem, Part 1.
Computer system manual,
Richard L. Page, Angelo M. Pellicciotto, and Dale J. Sanders. 1 Jun 74, 358p Rept no. NMCSSC-CSM-mm-9-74-vol-5-pt-1
See also Volume 4 Part 2, AD-A011 435.

Descriptors: *Nuclear warfare, *War games, *Computer programming, Computerized simulation, Strategic warfare, Antimissile defense systems, Antiaircraft defense systems, Allocations, FORTRAN, Instruction manuals.
Identifiers: QUICK(Quick Reacting General War Gaming System), Quick reacting general war gaming system.

The computerized Quick-Reacting General War Gaming System (QUICK) will accept input data, automatically generate global strategic nuclear war plans, simulate the planned events, and provide statistical output summaries. QUICK has been programmed in FORTRAN for use on the NMCSSC HIS 6080 computer system. This volume, Volume V, provides the programmer/analyst with a technical description of the purpose, functions, general procedures, and programming techniques applicable to the programs and subroutines of the Simulation (or Simulator) subsystem.

AD-A011 587/3GA PC$4.75/MF$2.25
Air Force Weapons Lab Kirtland AFB N Mex
Determination of Aircraft Survival from a Surprise Nuclear Attack.
Final rept. 1 Dec 73-1 May 74,
Arthur R. Geldback, Harry F. Doyle, and William F. Peay, III. May 75, 83p Rept no. AFWL-TR-74-123

Descriptors: *Air Force facilities, *Guided missile targets, *Kill probabilities, Aircraft, Submarine launched, Underwater to surface missiles, Linear programming, Survival(General), FORTRAN, Computer programs.
Identifiers: *Weapon laydown, Computer aided analysis, CDC 6600 computers.

Aircraft positioned at specified locations are subject to an attack from sealaunched ballistic missiles (SLBMs). This report presents a technique for the determination of the number of alert aircraft that can be destroyed by the first missile arriving on each base. The assignment problem, a special case of the linear programming transportation problem, is applied to arrive at the optimal allocation of missiles to targets. Aircraft losses are determined using a step distribution function for overpressure and thermal nuclear hardness levels which are input for each aircraft type being considered. A FORTRAN computer program which performs the calculations is presented.

15G. Operations, Strategy, and Tactics

AD-A011 613/7GA PC$5.25/MF$2.25
Rand Corp Santa Monica Calif
Scheduling Aircrews and Aircraft: Problems of Resource Allocations in the Strategic Air Command.
Interim rept.,
Morton B. Berman. Jan 75, 121p Rept no. R-1610-PR
Contract F44620-73-C-0011

Descriptors: *Strategic Air Command, *Bomber aircraft, *Allocations, Resource management, Efficiency, Organization theory, Policies, Decision making, Flight crews, Scheduling, Maintenance management.
Identifiers: B-52 aircraft, Resource allocation.

The investigation focuses on the B-52 flying organizations of the Strategic Air Command in an attempt to demonstrate how organizational behavior affects internal resource allocation efficiency in a public-sector organization. Existing organization theory is used to develop a set of predictive hypotheses on how resource allocation decisions are made at the wing level. Selected hypotheses on sources of inefficiency and on how and why resources are allocated differently among bomb wings are empirically tested using data obtained in field visits to wings. Resulting analyses are used to identify methods for improving decision behavior. See also R-1435-PR.

16. MISSILE TECHNOLOGY

16D. Missiles

N75-22639/9GA PC$3.25/MF$2.25
Laboratoire de Recherches Balistiques et Aerodynamiques, Vernon (France). Service Aerodynamique.
Recession Velocity of an Ablative Material Measured in Hyperballistic Wind Tunnel Mesure au Tunnel Hyperballistique de la Vitesse de Recession d'UN Materiau en Ablation.
A. Desgardin. 15 Nov 74, 16p LRBA-E-828-NT-5/SAE
Language in French.

Descriptors: *Ablative nose cones, *High resolution, *Hypersonic wind tunnels, *Hypervelocity projectiles, *Pulsed lasers, *Wind tunnel tests, Aerodynamic drag, Enthalpy, Geometry, Hypersonic speed, Pressure effects, Ruby lasers, Time dependence.

For abstract, see STAR 1314

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A011 356/3GA PC$4.25/MF$2.25
Texas Univ At Austin Applied Research Labs
Electronic Scanning Techniques for Parametric Transmitters.
Annual rept. 1 Dec 72-30 Sep 73,
Robert L. White. 24 Jan 74, 74p Rept no. ARL-TR-74-2
Contract N00014-70-A-0166

Descriptors: *Sonar projectors, Electronic scanners, Parametric devices, Scanning, Beam steering, Sonar, Coding.

A study was conducted to investigate four scanning techniques for forming multiple parametric beams in high resolution parametric sonar systems. A coded pulse scan technique employing coded pulse sequences for azimuth sector identification was found to be best suited for this application. A system was designed, constructed, and used to demonstrate the electronic scanning of a parametric beam. A nominal 2.3 degree beam was steered at angles of plus or minus 1 degrees, plus or minus 7 degrees, and plus or minus 14 degrees. The source level was 181 dB re micro Pa at 1 m. The system developed will be further employed to evaluate word sets to be used in coded pulse parametric transmitters.

AD-A011 358/9GA PC$5.25/MF$2.25
Texas Univ At Austin Applied Research Labs
Signal Detection in Inhomogeneous Reverberation,
Joseph E. Blue. 1 Apr 71, 116p Rept no. ARL-TR-71-21
Contract N00014-70-A-0166

Descriptors: *Sonar signals, *Reverberation, Signal processing, Gaussian noise, Stochastic processes, Probability density functions, Histograms.
Identifiers: Signal detection.

Signal-generated noise is called reverberation. Reverberation is considered to be a Gaussian process since the number of scatterers contributing to the process at a given time is generally large. However, for high-resolution sonar, the number of scatterers in the resolved area (or volume) may be so small as to result in a non-Gaussian process. The set of sonar returns resulting from consecutive projected pulses is generally considered to be a true ensemble. However, when the mean intensity varies from return to return, the set can no longer be considered to constitue a true ensemble. The overall objective of this study was to test the Gaussian and ensemble assumptions made about reverberation data at a carefully chosen smooth bottom site and to evaluate the performance of signal processors operating against the recorded reverberation.

17B. Communication

AD-A011 166/6GA PC$4.25/MF$2.25
University of Southern California Marina Del Rey Information Sciences Inst
Basic Functional Capabilities for a Military Message Processing Service.
Research rept.,
Ronald Tugender, and Donald R. Oestreicher.
Sep 74, 55p Rept no. ISI/RR-74-23
Contract DAHC15-72-C-0308, ARPA Order-2223

Descriptors: *Communications networks, *Message processing, Military applications, Information processing.
Identifiers: Computer networks, Military communication.

This report describes the functional capabilities necessary to support an advanced military message processing service. The functions described are meant to be incorporated as part of a larger, more comprehensive effort which addresses the total needs of the military message processing community. The functions discussed include those for message creation, coordination, transmission, delivery, reception, and archival. With respect to these functions, specific needs of a potential military user group are addressed.

AD-A011 429/8GA PC$7.50/MF$2.25
Defense Communications Engineering Center Reston Va
A System Control Alternative Analysis.
Technical note,
D. Schutzer, V. Grace, F. Ricci, O. Halpeny, and M. Potter. Apr 75, 233p Rept no. TN-5-75

Descriptors: *Communication and radio systems, Control, Systems analysis, Cost analysis, Survival(General), Reliability, Department of Defense.
Identifiers: Defense Communications System.

The DCS (Defense Communications System) consists of an interconnected global system of transmission and switching center facilities whose primary goal is to provide longhaul communications for the Department of Defense. The analysis presented in this report answers many questions and provides insight into the system control problem but also raises many new issues and questions. The need for a system control upgrade and the advantages of a decentralized near-real-time system control architecture over the present system are demonstrated. These advantages include improvements in performance and survivability/reliability and reductions in manpower requirements and life cycle cost. The appropriate procurement investment has been narrowed to an acceptable range, however, the specific recommended investment remains to be determined.

AD-A011 453/8GA PC$5.25/MF$2.25
Office of Telecommunications Boulder Colo Inst for Telecommunication Sciences
Probabilistic Interference Prediction Model-Computer Programs.
Final rept. Jan 74-Jan 75,
John R. Juroshek. Feb 75, 108p FAA-RD-75-33
Contract DOT-FA74WAI-441

Descriptors: *Radiofrequency interference, *Frequency allocation, Probability, Mathematical models, Computer programs, Monte Carlo method, Very high frequency, Statistical analysis, Air traffic control systems, Mobile, Communication and radio systems.
Identifiers: DOT/4HZ/HD.

The report describes a statistical method for predicting interference between air traffic control frequency assignments in the VHF aeronautical mobile frequency band. This procedure results in a probability of interference representing the statistical chances of interference occurring between two air traffic control sectors operating on co-channel of adjacent channel frequency assignments. The model accounts for both the spatial distribution of the interfering aircraft as well as the statistical nature of voice communications. Two computer programs are described for computing probability of interference given the pertinent geometry of the victim and interfering sectors as well as their air/ground channel utilization figures. One of the computer programs uses Monte-Carlo methods to arrive at the answer while the other solves a deterministic set of equations to obtain an approximate solution at a considerable savings in computer execution time. The report also examines the problem of probability of interference given multiple interfering air traffic control sectors and concludes that for small victim sectors the source of interference is very likely to be one particular interfering sector. Large victim sectors, however, can experience nearly equal interference from more than one sector.

AD-A011 490/0GA PC$8.50/MF$2.25
Arinc Research Corp Annapolis Md
A Study of the Communications Requirements for a 1985 to 2000 Operational Aeronautical Satellite System. Volume I: Atlantic Ocean Area. Phase 1.
Final rept.,
Danny E. Cornett, J. Kent Haspert, James H. Diehl, and Steven C. Nardone. May 75, 267p
Rept no. 1307-01-1-1401 FAA-RD-75-80
Contract DOT-FA75WA-3544

Descriptors: *Satellite communications, Air transportation, Radio relay systems, Communication satellites, Requirements, Atlantic Ocean, Forecasting, Multichannel communications.
Identifiers: DOT/4HZ/HD, AEROSAT satellites.

A study was conducted to determine the number of communications channels required by an operational aeronautical satellite system during the period 1985-2000. Seven alternative operating scenarios have been considered, and the communications channels required by each have been evaluated. The evaluation entailed (1) the characterization of present oceanic communications traffic, (2) the estimation of future communications traffic as an extension of present-day traffic, and (3) the generation of operating scenarios and the determination of the number of communications channels required. The effort concentrated on air-to-ground and ground-to-air communications and incorporated the views of major international air carriers. Channel requirements were based on the assumption that a single control point would be used to control the use of channels, and calculations excluded any spare channels for system backup, emergency alerts or dedicated continuous broadcast purposes.

AD-A011 577/4GA PC$3.25/MF$2.25
Advisory Group for Aerospace Research and Development Paris (France)
Amplitude Scintillation Observations and Systems Application,
Herbert E. Whitney, and Jules Aarons. 17 Jun 75, 18p AFCRL-TR-75-0330
NATO furnished. Pub. in Conference Proceedings on Radio Systems and the Ionosphere, Pre-Print No. 173, May 26-30, 1975, Athens, Greece.

Descriptors: *Scintillation, *Ionosphere, *Fading(Electromagnetic waves), Satellite communications, Radio relay systems, Communication satellites, Statistical analysis.
Identifiers: *Ionospheric scintillations.

For the design of a transionospheric communications link, scintillation data should be available to describe the statistics of adequate signal level, that is, the time durations that the signal power remains above specified levels, and the statistics of fades, that is, the time durations that the signal power remains below specified levels. The adequate signal level statistics assist designers in choosing data frame formats, message length, and estimating reliability of message reception. The fade statistics are useful in choosing coding and/or time diversity techniques to overcome this fading. Signal statistics of this type are illustrated using data recorded at equatorial, sub-auroral, and auroral latitudes. These signal statistics must be folded

into a morphological pattern which contains statistics of scintillation fading as a function of geomagnetic latitude, instantaneous magnetic excursion, and local time. Recent data taken at auroral and sub-auroral latitudes have shown the effects on F layer irregularities of magnetic storms. In particular, the magnetic storms of August 1972 illustrate worst case scintillation levels. Data during the storm of October 31 - November 1, 1972 is used to show the correlation of scintillation with local magnetic variations.

AD-A011 661/6GA PC$3.25/MF$2.25
Computer Sciences Corp Falls Church Va Geonautics Operation
Signal Transmission Using Nonuniformly Spaced Samples. A General Theory.
Interim rept.,
Farokh A. Marvasti, and Lester A. Gerhardt.
1975, 7p AFOSR-TR-75-0802
Grant AF-AFOSR-2486-73

Descriptors: *Data transmission systems, *Coding, *Signal processing, Information theory, Fourier transformation, Spectrum analysis, Periodic functions.

The aim of this paper is to establish a unified analysis and development of new techniques to eliminate some of the redundancy in digital communication by using different implementations for the source endoder and decoder at the transmitter and receiver respectively. It is the intention to optimize the communication systems in terms of transmission rate, bandwidth requirements and quantization noise. This is accomplished by developing novel techniques that use nonuniform samples usually at one bit per sample transmitted at an average Nyquist rate and which are practically implementable.

AD-A011 677/2GA PC$3.25/MF$2.25
Maryland Univ College Park Computer Science Center
Improving ARQ Performance on Satellite Channels Under High Error Rate Conditions.
Interim rept.,
A. R. K. Sastry. Dec 74, 9p AFOSR-TR-75-0640
Grant AF-AFOSR-1982-71
Pub. in 1974 IEEE National Telecommunications Conference, p982-986 Dec 74.

Descriptors: *Data transmission systems, Communication satellites, Radio relay systems, Errors, Control, Rates, Satellite communications.

Large round trip delay associated with satellite channels reduces the throughput for automatic repeat-request (ARQ) system of error control, rather drastically under high error rate conditions. Ground segments that usually accompany satellite circuits at both ends introduce bursts of errors, during which block error rates tend to be quite high bringing down the throughput to very low values. In this paper, some schemes that modify the currently known variations of ARQ (Stop and Wait and continuous systems) are suggested with a view to obtain higher throughput under high block error rate conditions. Specifically, the modified Go back 'N' System appears to be quite attractive as it gives substantial improvement with little additional complexity in system implementation.

COM-75-10793/8GA PC$4.25/MF$2.25
Office of Telecommunications, Boulder, Colo. Inst. for Telecommunication Sciences.
Confidence Limits for Digital Error Rates,
Edwin L. Crow. Nov 74, 74p OTR-74-51
Paper copy also available from GPO.

Descriptors: *Data transmission, *Confidence limits, Error analysis, Sampling, Probability density functions, Experimental design.

Confidence limits for error rates (probabilities of an error) of digital communication systems are derived and implemented under the assumptions that the error rate is constant and the trials are independent. Four types of samples are considered: prescribed sample size (binomial sampling), prescribed number of errors (inverse binomial sampling), both sample size and number of errors bounded (truncated binomial sampling), and truncated binomial sampling with sample size also bounded below. Both exact confidence limits and good approximations for them in the communications situation of very small error rates are presented. Point as well as interval estimates are presented. The planning of the experiment is discussed.

COM-75-10803/5GA PC$5.75/MF$2.25
Office of Telecommunications, Boulder, Colo. Inst. for Telecommunication Sciences.
Geographical Areas Serviced by Bell and Independent Telephone Companies in the United States,
B. A. Hart. Feb 73, 126p OTR-73-1
Paper copy also available from GPO.

Descriptors: *Telephone systems, *Geographic area, *Maps, Business organizations, Indexes(Documentation), United States.
Identifiers: *Telephone companies, States(United States).

The geographic coverage of all telephone companies in the U.S. is presented in a series of maps. These consist of U.S. maps of operating areas served by the major companies, and individual state maps depicting the operating areas served by Bell and each of the various independent companies. State by state listings of over 1500 telephone companies and their headquarters are given.

JPRS-L/5081 PC$3.75
Joint Publications Research Service, Arlington, Va.
Program of the Ukrainian Republic Scientific and Technical Conference in Honor of Radio Day (19th).
30 Oct 74, 42p
Trans. of mono. Ukrainskaya Respublikanskaya Nauchno-Tekhnicheskaya Konferentsiya, Posvyashchennaya dnyu Radio-Programma (no. 19) Kiev, 1969 p1-45. Paper copy available to U.S. Government recipients only.

Descriptors: *Telecommunication, *Meetings, *USSR, Translations.

Contents: Wire communications; Magnetic recording; Radio transmitter; Television; Quantum radiophysics; Radar; Microwave engineering; Statistical radioengineering and electroacoustics; Electric circuit theory; Reliability of radioengineering; Automated control systems; Cybernetics; Chemotronic devices and structures; Radio electronics in medicine and biology.

NTIS/PS-75/516/5GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Telephone Systems (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
David W. Grooms. Jun 75, 207p*
Supersedes NTIS/PS-74/087.

Descriptors: *Bibliographies, *Telegraph systems, *Telephone systems, *Telecommunication, Telephone cables, Telephone circuits, Global communication, Materials tests, Radiotelephones, Rental equipment, Rates(Costs), Spacecraft communication.
Identifiers: Touchtone telephones, Interconnection(Telephone).

Research is presented on all aspects of the telephone industry. This includes research covering the manufacture, design, and installation of various kinds of telephone-telegraph equipment, studies on materials research for telephone cables and the application of telephones in weather forecasting, emergency call systems, and in medical facilities. (Contains 202 abstracts). For economic studies of the telecommunications industry see NTIS/PS-75/400, Telecommunications--Economic Studies.

NTIS/PS-75/546/2GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Land Mobile Communications (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
William E. Reed. Jul 75, 56p*

Descriptors: *Bibliographies, *Radio communication, Mobile equipment, Urban areas, Radio equipment, Radio transmission, Frequency allocations, Telecommunication, Communications management, Policies, Television systems, Radiofrequency interference, Licenses, Forecasting.
Identifiers: *Land mobile communications.

The cited Federally-sponsored research reports include topics on public policy, frequency allocation and management, licensee data, satellite relays, propagation, and forecasts. (Contains 51 abstracts).

NTIS/PS-75/547/0GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Portable Radio Equipment (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
William E. Reed. Jul 75, 70p*

Descriptors: *Bibliographies, *Radio equipment, Portable equipment, Antennas, Radio transmission, Power supplies.

Federally-sponsored research is cited on portable transmitters, receivers, antennas, power sources, and components. Reports on wave propagation of portable radio equipment are included. (Contains 65 abstracts).

N75-22384/4GA PC$6.25/MF$2.25
Washington Univ., St. Louis, Mo. Center for Development Technology.
Market Scenarios and Alternative Administrative Frameworks for US Educational Satellite Systems.
J. E. Walkmeyer, Jr., R. P. Morgan, and J. P. Singh. Apr 75, 169p NASA-CR-142711, CG-75/2
Contract NGR-26-008-054

Descriptors: *Education, *Educational television, *Market research, *Satellite television, Satellite transmission, Systems engineering, United states of america.

For abstract, see STAR 1314

N75-22559/9GA PC$8.75/MF$2.25
Texas Instruments, Inc., Dallas. Equipment Group.
S-Band Antenna Phased Array Communications System.
Final Report.
D. R. Delzer, J. E. Chapman, and R. A. Griffin.
Mar 75, 282p NASA-CR-141756
Contract NAS9-14196

Descriptors: *Antenna design, *Phased arrays, *Radio communication, *Spacecraft communication, Electronic equipment tests, Electronic

modules, Superhigh frequencies, Ultrahigh frequencies.

For abstract, see STAR 1314

N75-22560/7GA PC$9.25/MF$2.25
Magnavox Co., Silver Spring, Md. Advanced Systems Analysis Office.
Shuttle Communications Design Study.
Final Report.
D. E. Cartier. 31 Mar 75, 305p NASA-CR-141761, ASAO-PR20056-12
Contract NAS9-13791

Descriptors: *Phased arrays, *Radio communication, *Space shuttles, *Spacecraft communication, Blackout (Propagation), Multipath transmission, Radio antennas, Telemetry.

For abstract, see STAR 1314

N75-22561/5GA PC$3.75/MF$2.25
Axiomatix, Marina del Rey, Calif.
Integrated Source and Channel Encoded Digital Communication System Design Study.
Final Report.
G. K. Huth, B. D. Trumpis, and S. Udalov. 25 Apr 75, 45p NASA-CR-141779, R7504-1
Contract NAS9-13467

Descriptors: *Channels (Data transmission), *Coding, *Pulse code modulation, *Pulse communication, Channel capacity, Data links, Error correcting codes, Space shuttles, Ultrahigh frequencies.

For abstract, see STAR 1314

N75-22586/2GA PC$3.75/MF$2.25
Australian Post Office Research Labs., Melbourne.
A Technique for Evaluating the Retiming Operation of Primary PCM Regenerators.
G. J. Semple. May 74, 49p REPT-6852

Descriptors: *Digital systems, *Pulse code modulation, *Regenerators, *Timing devices, Analog circuits, Digital techniques, Error correcting devices, Signal distortion.

For abstract, see STAR 1314

N75-23158/9GA PC$3.75/MF$2.25
Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
Speculations on Bilingualism and the Cognitive Network.
M. M. Taylor. Mar 74, 59p DCIEM-74-RP-1013
Rean-Repr. From Working Papers on Bilingualism (Toronto), Issue 2, Mar. 1974 p 68-124.

Descriptors: *Network synthesis, *Words (Language), Cognition, Sensory perception, Speech.

For abstract, see STAR 1314

PAT-APPL-561-770/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Adaptive Gray Scale Control Circuit for Television Video Signals.
Patent Application,
Edwin B. Sirrine. Filed 25 Mar 75, 8p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Television equipment, *Signal processing, Patents, Circuits, Video signals, Adaptive systems, Gray, Comparators, Integrators, Feedback.
Identifiers: *Patent applications, PAT-CL-178-1-5-4-ML.

According to the patent application, television picture 'wash-out' is eliminated by means of a signal processing circuit that adapts and enhances the video gray scale of television pictures to compensate for adverse lighting conditions in the viewed area. The circuit approach comprehends processing the video signal in terms of picture area. Each step on the gray scale from black to white is assigned a percentage of the total picture. The circuit comprises a plurality of comparators each working at a different threshold level. Each comparator is followed by an integrator and a feedback circuit that adapts that comparator sense level to the incoming signal. The video signal is processed in a way that always produces certain assigned ratios of black, white, and/or shades of gray.

PAT-APPL-566 494/GA Not available NTIS
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Speech Analyzer.
Patent Application.
D. C. Lokerson. Filed 9 Apr 75, 23p NASA-CASE-GSC-11898-1
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Pulse amplitude, *Signal analyzers, *Speech recognition, *Waveforms, Automatic gain control, Frequency measurement, *Patent applications, Phonemes.

A speech signal is analyzed by applying the signal to formant filters which derive first, second, and third signals respectively representing the frequency of the speech waveform in the first, second, and third formants. A first pulse train having approximately a pulse rate representing the average frequency of the first formant is derived; second and third pulse trains having pulse rates respectively representing zero crossings of the second and third formants are derived. The first formant pulse train is derived by establishing N signal level bands, where N is an integer at least equal to two. Adjacent ones of the signal bands have common boundaries, each of which is a predetermined percentage of the peak level of a complete cycle of the speech waveform. Normalization was attained in each instance by counting the number of pulses in the first and third pulse trains over the interval required for the pulses in the second train to reach a predetermined number. The resulting normalized pulse trains are supplied to a memory to identify a phoneme in the speech signal or are transmitted as narrow band width signals.

PB-242 012/3GA PC$3.25/MF$2.25
National Inst. of Law Enforcement and Criminal Justice, Washington, D.C.
Repeaters for Law Enforcement Communication Systems-Law Enforcement Standards Program,
R. M. Jickling, and J. F. Shafer. Oct 74, 21p LEAA-LESP-RPT-0206.00

Descriptors: *Radio repeaters, Law enforcement, Frequency modulation, Mobile equipment, Police.
Identifiers: Land mobile communication systems.

In its simplest form, a repeater consists of a receiver on one frequency with its audio output connected to the audio input of a transmitter operating on a second frequency. Use of repeaters enhances mobile-to-mobile coverage in terrain that would otherwise result in unsatisfactory communications. Personal transceivers, with their low power and reduced antenna efficiency, also benefit from the increased signal strength provided by the repeater. This report is concerned with FM repeaters used in land mobile communications systems. Repeater systems are described with emphasis on appropriate antenna site selection, signal-rejection techniques, and specialized transmission-line components for the transmission and reception of signals. Repeaters using the vehicle transceiver are mentioned. Repeaters at microwave frequencies are described to the extent that their use for control and as audio links is pertinent. Measurement techniques that are unique to land-mobile repeaters are discussed.

PB-242 237/6GA PC$3.75/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.
The M.I.T. Report: Consumer Appliances: The Real Cost.
Final summary rept.
May 74, 34p* NSF/RA/X-74-013
Grant NSF-GI-34841
See also PB-238 070.

Descriptors: *Television equipment, *Refrigerating machinery, *Maintenance, *Consumer problems, Repair services, Costs, Consumer products, Reliability, Quality, Electric equipment, Consumer relations, Appliance repairs.
Identifiers: Life cycle costing, Color television, Warranties.

The system for maintaining and servicing major home appliances and electronics products (specifically, refrigerators and color televisions) was examined and new light shed on the total costs paid by consumers during a product's useable life. The cost of purchase, service, and energy was assessed and compared, and combined to give the life-cycle cost of the product. The report suggests a number of steps that consumers, manufacturers, and government agencies can take to improve problem areas and correct the most glaring abuses.

PB-242 242/6GA PC$3.75/MF$2.25
Massachusetts General Hospital, Boston.
A Preliminary Evaluation of Telemedicine Program Audio Circuits in the Veterans Administration Teleconsultation System.
Annual rept. 1 Jul 73-30 Jun 75,
Stanley Krainin, W. Scott Andrus, and Kenneth T. Bird. Jun 75, 30p
Contracts EMI-72C-001-01, EMI-74C-011-03
Pub. in Telemedicine: A New Health Information Exchange System Annual Report (7th), Section V. System Analysis and Documentation of Telemedicine.

Descriptors: *Microwave relay systems, *Information systems, *Medical services, *Telecommunications, Voice communication, Intelligibility, Massachusetts, Medical examination, Evaluation, Distortion, Audio frequencies.
Identifiers: *Biomedical information systems, *Teleconsultation, Health care delivery systems, Communication networks.

A study was made of the audio characteristics of the telemedicine cricuitry linking the Veterans Administration Hospital, Bedford, Massachusetts to Massachusetts General Hospital, Boston, and the Logan International Airport Medical Station of the Massachusetts General Hospital. The loop configuration, in which the received signal at the distal site is routed to a transmitter and returned to the point of origin, was employed for all tests. In addition to each individual circuit, a tandem configuration was studied using both circuits; this configuration simulates a seven terminal transmission. Both circuits were found to be entirely adequate for transmission without degradation of speech or of auscultatory sounds. While the tandem configuration was satisfactory for speech, the frequency response was not good enough for auscultation; circuit adjustment or equalization would be needed to meet this requirement. A subsidiary study showed directly that the Bedford-MGH link does not degrade speech intelligibility.

PB-242 575/9GA PC$7.25/MF$2.25
Federal Communications Commission, Washington, D.C.
Cable Television Technical Advisory Committee Report to the Federal Communications Commission. Volume I: Steering Committee Summarization of Basic Report.
Final rept. 1972-75.
May 75, 204p* FCC/CTB-75/01

Descriptors: *Closed circuit television, Standards, Television receivers, Frequency allocations, Telecommunication, Broadband, Performance tests, Communications management, Recommendations.
Identifiers: *Cable television.

The report is a compilation of technical information concerning cable television and broadband communications. It is responsive to directives of the Federal Communications Commission to provide a current technological summary which can be used by the Commission to formulate appropriate technical regulations. The report contains significant bibliographies.

PB-242 793/8GA PC$4.25/MF$2.25
Dartmouth Medical School, Hanover, N.H. Dept. of Community Medicine.
Further Development and Expansion of a Model Interactive Television System.
Final rept. Jun 71-Nov 73,
Dean J. Seibert, George W. Welsh, Harold F. Pyke, Charlotte J. Sanborn, and Donald E. Sanborn, III. Dec 74, 57p LHNCBC-75-05
Contract N01-LM-1-4719

Descriptors: *Closed circuit television, Networks, Microwave communication, Hospitals, Interactions, Mobile equipment, Education, Speech therapy, New Hampshire, Vermont, Information systems.
Identifiers: Interactive television networks, Health care delivery systems, Health care facilities, Teleconsultation, Communication networks, Biomedical information systems.

During the period of this report the network grew from a 2 station, 28 mile leased link to a seven station microwave system spanning 180 air miles, joining the Dartmouth-Hitchcock Medical Center, the Claremont General Hospital, Claremont, N.H., the Central Vermont Medical Center at Berlin, Vt., and the Medical Center of Vt. at Burlington. In Nov, 1973 3 additional facilites began to be served by a mobile unit. During period of report, 2,481 program hours, at an average cost of $75/hr. were viewed by 23,589 people. The report contains descriptions of network operations, including programming, evaluation, coordination and scheduling; a technical description, and a financial report.

17E. Infrared and Ultraviolet Detection

AD-A011 212/8GA PC$7.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Night Vision Laboratory Static Performance Model for Thermal Viewing Systems.
Technical rept.,
James A. Ratches, Walter R. Lawson, Luanne P. Obert, Richard J. Bergemann, and Thomas W. Cassidy. Apr 75, 204p Rept no. ECOM-7043

Descriptors: *Night vision devices, *Night warfare, *Infrared detectors, Mathematical models, Computer programs, Military requirements, Infrared signatures, Infrared images, Background radiation, Display systems, Performance(Engineering), Temperature, Target designators, Signal to noise ratio.
Identifiers: Modulation transfer functions, Noise equivalent temperature.

The NVL thermal model predicts system noise equivalent temperature difference, minimum resolvable temperature, minimum detectable temperature and modulation transfer functions for any infrared imaging system. It also predicts detection and recognition as a function of range for a given atmosphere and target signature. This model is documented, and the validation from laboratory measurements and field experiments is also presented. The computer program and an in-depth user's manual are given in the appendices. This model can be and has been used in military systems analyses to direct component research, evaluate contractor proposals, and aid project manager decisions.

17G. Navigation and Guidance

AD-A011 210/2GA PC$3.75/MF$2.25
Eastern Air Lines Inc Miami Fla
Oceanic Air Route Navigation with Cycle Match Loran-C.
Final rept. Oct 74-Jan 75,
William S. Gillis. Apr 75, 49p FAA-RD-75-74
Contract DOT-FA74WA-3534

Descriptors: *Loran, Air traffic, Oceans, Radio receivers, Flight testing, Reliability.
Identifiers: Loran C navigation systems, Evaluation, DOT/4IZ/ID.

A Loran-C cycle matching receiver (Decca Model ADL-81) was evaluated in line service to determine its qualification as a potential replacement for Loran-A. The receiver and associated components were installed on an Eastern Air Lines L1011 aircraft and data were collected by a qualified navigator on the routes between the U.S. Mainland and Puerto Rico. Results of the program indicate that cycle matchine Loran-C is a satisfactory substitute for Loran-A where usable signals are available. The equipment under evaluation provided excellent accuracy and required less flight crew attention than is normally demanded by the present Loran-A systems.

AD-A011 389/4GA PC$3.75/MF$2.25
California Univ Los Angeles Dept of Engineering Systems
The Tri-Lobed Azimuthal Symmetric Case of the Optimum Orientation of Accelerometers for Ballistic Vehicles,
E. C. Hoy, and C. T. Leondes. 1973, 33p AFOSR-TR-75-0638
Grant AF-AFOSR-2166-72
Availability: Pub. in the Jnl. of Astronautical Sciences, v21 n3/4 p154-184 Nov 73-Feb 74.

Descriptors: *Accelerometers, *Azimuth, Parametric analysis, Three dimensional, Orientation(Direction), Optimization, Symmetry, Ballistic trajectories, Inertial systems, Circular error probable, Problem solving, Trade off analyses, Reprints.

A direct analytic solution to the three-dimensional problem of optimizing a tri-lobed azimuthal symmetric configuration of a triad of inertial accelerometers is derived. In addition to an analytic solution for the optimum orientation and performance of a general non-orthogonal triad of typical accelerometers, numerical examples are given. (Author)

AD-A011 449/6GA PC$9.50/MF$2.25
Naval Air Development Center Warminster Pa Naval Navigation Lab
Flight Test Evaluation of AVOID I (Avionic Observation of Intruder Danger) Collision Avoidance System.
Final rept.,
J. Hinds, and O. Shames. May 75, 334p Rept no. NADC-75056-60
Contract DOT-FA73WAI-358

Descriptors: *Collision avoidance, *Avionics, *Flight testing, Interrogators, Transponders, Reliability, Accuracy, Warning systems, False alarms, Data links, Air to Air, Digital systems, Air traffic, Separation, Radio links.
Identifiers: *AVOID(Avionic Observation of Intruder Danger), *Avionic observation of intruder danger, *CAS(Collision Avoidance Systems), *Collision avoidance systems.

AVOID is a candidate for a national standard collision avoidance system. A comprehensive flight and laboratory evaluation of the AVOID I version was conducted including the ability to communicate accurately and with sufficient distance to provide timely and correct advisories and maneuver commands in simulated high traffic density.

AD-A011 461/1GA PC$7.25/MF$2.25
RCA Electromagnetic and Aviation Systems Div Van Nuys Calif
River and Harbor Aid to Navigation Systems (RIHANS), Phase II-R: Experimental Resolution of Technical Uncertainties.
Final rept. Jul 73-May 74,
J. E. Browder, J. Hall, L. Anderson, J. Lyon, and L. Motisher. Aug 74, 213p USCG-D-62-75
Contract DOT-CG-24773-A
See also report dated 6 Apr 72, AD-771 860.

Descriptors: *Radio navigation, Rivers, Harbors, Transponders, Position finding, Accuracy, Field tests, Radio equipment.
Identifiers: River and harbor aid to navigation systems, RIHANS(River and Harbor Aid to Navigation Systems), DOT/4IZ/ID.

RIHANS Phase II of a precision navigation system for use in rivers and harbors covered the design and construction of equipment and laboratory tests and field demonstrations. The RCA RIHANS approach used active ranging in the S-band of the microwave region. The equipment consisted of two shore stations (Transmitting Equipment, TE) and three interrogators (Position Determining Equipment, PDE). After extensive laboratory testing at the Electromagnetic and Aviation systems Division of the RCA Corporation in Van Nuys, California, the equipment was field tested at the Long Beach harbor area, and then very extensive tests in the Galveston, Texas area. The accuracy of the RIHANS equipment was excellent. Measurements were taken at distances, ranging from 500 yards to 12,147 yards, with consistent results well within the required specifications of plus or minus 3 yards for equipment with a 4 nautical mile range capability. The accuracies exhibited by the RIHAN System demonstrated its ability to operate in a severe multipath condition. The tests also indicated an ability to operate through or near thin structures, such as cranes and ship superstructures.

AD-A011 483/5GA PC$8.75/MF$2.25
Tracor Inc Austin Tex
River and Harbor Aid to Navigation System (RIHANS). Phase 2T: Experimental Resolution of Technical Uncertainties.
Final rept. Jul 73-Jul 74,
L. W. Shinn, and R. Caddel. Dec 74, 293p USCG-D-79-75
Contract DOT-CG-24775A
See also report dated Aug 73, AD-771 868.

Descriptors: *Radio navigation, Rivers, Harbors, Navigational aids, Low frequency, Position finding, Field tests, Performance tests, Radio equipment.
Identifiers: River and harbor aid to navigation systems, RIHANS(River and Harbor Aid to Navigation Systems), DOT/4IZ/ID.

RIHANS Phase II of a precision navigation system for use in rivers and harbors covered the design and construction of equipment, laboratory tests, and field demonstrations. The

TRACOR RIHANS approach was a low frequency, hyperbolic system that operated on the principle of phase comparison of time shared multiple frequency CW signals; much like OMEGA. The equipment consisted of three shore station and a monitor station (Service Segment), and three receiving equipments (Position Determining Equipments, PDE). After extensive laboratory testing at the TRACOR facilities, the system was given a limited field test in the Austin, Texas area. This was followed by more extensive field tests in the Galveston, Texas area.

AD-A011 485/0GA PC$4.25/MF$2.25
National Bureau of Standards Washington D C
Validation of Maximum Airport Throughput Levels Estimated by the DELCAP Simulation Model.
Final rept.,
Judith F. Gilsinn. Jan 75, 73p Rept no. NBS-IR-75-638 FAA-RD-75-66
See also report dated May 71, AD-745 513.

Descriptors: *Terminal flight facilities, *Air traffic control systems, Air traffic, Runways, Capacity(Quantity), Scheduling, Queueing theory, Computerized simulation.
Identifiers: DOT/4DZ/DA, DOT/4IZ/ID, DELCAP computer program, *Runway capacity, *Airport capacity.

This report documents exercises of the DELCAP airport terminal area simulation model performed to validate the maximum throughput calculations of that model. DELCAP was run for five different runway configurations, with three or four appropriate operating policies chosen for each, and for three different mixes of aircraft types. Throughput estimates from DELCAP are found to be in general agreement with current values provided by the FAA. One specific instance of greater discrepancy is identified, and a remedy for it is proposed. Changes made in DELCAP since its original documentation in 1971 are described in an appendix.

AD-A011 489/2GA PC$7.00/MF$2.25
Rome Air Development Center Griffiss AFB N Y
FAA Lightning Protection Requirements for Mark III Instrument Landing System (Category III).
Final rept. 1 Jan 74-1 Feb 75,
Gene K. Huddleston, and Gary G. Bush. Feb 75, 195p FAA-RD-75-73
Contract DOT-FA72WAI-356

Descriptors: *Instrument landings, *Transient radiation effects, Protection, Lightning, Solid state electronics, Transients, Suppressors.
Identifiers: Instrument landing systems, DOT/4IZ/ID.

The withstand capabilities and protection requirements for solid state circuits of the Mark III Instrument Landing System (Cat. III) susceptible to lightning-induced transients on buried control cables are presented. Susceptible circuits and components were identified from the wiring diagrams as transistors, diodes, relay contacts, and electrolytic capacitors. Withstand capabilities of each circuit were determined analytically and experimentally using manufacturer's data and a 1000-volt, 10 x 1000 microsec test waveform. Avalanche diode surge protectors and series resistance are recommended to protect susceptible circuits from lightning-induced transients on buried control cable conductors connected to the circuits.

AD-A011 573/3GA PC$4.75/MF$2.25
Facility Checking Squadron (1866th) (Afcs) Richards-Gebaur AFB Mo
TACAN Station Evaluation Report, Hurlburt Field, Fl. Evaluation Period 18-26 November 1974,
Geoffry S. Howard. Nov 74, 76p Rept no. 74/66T/29

Descriptors: *Tacan, Performance tests, Air Force Facilities, Florida.
Identifiers: AN/GRN-20B, Evaluation, Eglin Air Force Base, Hurlburt Field.

The report contains the results of the AN/GRN-20B TACAN station evaluation at Hurlburt Field, FL during the period 18-26 November 1974. Ground evaluation results revealed an exceptionally well maintained TACAN. Flight evaluation results showed the TACAN to provide solid coverage throughout the 40 NM/18000 ft protected service volume except in two restricted areas. One of these restrictions is caused by line of sight screening by a large hangar west of the TACAN. The other restriction is due to false azimuth locks to the north. Taken together, the ground and the flight evaluation results fully define the capabilities and limitations of the TACAN. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in the ground equipment or until a change occurs in the horizon screening.

AD-A011 649/1GA PC$4.75/MF$2.25
Facility Checking Squadron (1866th) (Afcs) Richards-Gebaur AFB Mo
TACAN Special Evaluation Report, Buckley ANGB, Colorado. Evaluation Period 18-28 February 1975,
Geoffry S. Howard. Feb 75, 96p Rept no. 75/66S-35

Descriptors: *Tacan, Reliability, Colorado, National Guard, Airports.
Identifiers: AN/GRN-19A, Evaluation.

The report contains the results of the AN/GRN-19A TACAN special evaluation at Buckley ANGB, Colorado during the period 18-28 February 1975. This special evaluation was to determine the cause of unreliability on the TACAN runway 32 approach. Many level runs at various altitudes were made on the approach radial and on adjacent radials to obtain data for a profile of the interference field pattern (nulls) on the approach. Analysis of this flight data indicates that several nulls are present. These nulls account for the azimuth roughness and unlocks and the occasional DME unlocks. The report contains recommendations toward correction of the nulling problem. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in the ground equipment or until a change occurs in the horizon screening.

AD-A011 650/9GA PC$5.25/MF$2.25
Facility Checking Squadron (1866th) (Afcs) Richards-Gebaur AFB Mo
TACAN and ILS Station Evaluation Report, Bergstrom AFB, Texas,
Joseph N. Raeth. 15 May 75, 122p Rept no. 75/66N-33

Descriptors: *Tacan, *Instrument landings, *Glide path systems, Landing aids, Radio transmitters, Glide slope, Performance tests, Air Force facilities, Texas.
Identifiers: AN/GRN-19A, AN/MRN-7A, AN/GRA-121A, AN/GRA-121A, Evaluation.

The evaluation report presents data collect and analyzed to define the capabilities and limitations of the Bergstrom AFB TACAN (AN/GRN-19A), ILS (AN/MRN-7A and AN/MRN-8A0, and associated power systems. The report documents that TACAN AN/GRA-121A antenna is providing excellent service and that 5 dB reduction in power results in a neglibible difference in TACAN coverage. The efforts to correct out of tolerance symmetry on the glide slope and less than optimum AC voltages at the TACAN and ILS are discussed. Glide slope symmetry is now within tolerance. Coordination between the local communications squadron and the base civil engineers to correct the power problems will be necessary. Airborne and ground evaluations indicated that the facilities were fully capable of providing satisfactory service.

AD-A011 651/7GA PC$5.25/MF$2.25
Facility Checking Squadron (1866th) (Afcs) Richards-Gebaur AFB Mo
Radar Station Evaluation Report, Seymour Johnson AFB, N.C.,
Robert L. Cranston. 25 Apr 75, 107p Rept no. 75/66R-34

Descriptors: *Air traffic control systems, *Radar stations, *Airport radar systems, Radar beacons, Search radar, Performance tests, Air Force facilities, North Carolina.
Identifiers: AN/GPN-12, AN/FPN-16, AN/TPX-42, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, Evaluation.

The radar Traffic Control and Landing Systems (TRACALS) station evaluation report presents data collected 28 Jan - 11 Feb 1975, to define the capabilities and limitations of the Radar Approach Control Facility located at Seymour Johnson AFB, NC. The facility is comprised of an AN/GPN-12 radar set, AN/FPN-16 radar set, AB/TPX-42 Air Traffic Control Radar Beacon System (ATCRBS), and associated power systems. Included in this report are descriptions of the lower, upper, inner and outer fringes of the useable radar coverage; Line of Sight Diagrams; ATCRBS coverage and tracking capabilities; analysis of flight and performance data; and performance predictions for these systems. The data presented in this report can be used as a guide for anticipated performance until there is an addition, deletion or relocation of equipment which would change the facility's capability or until a change occurs in the screening profile.

AD-A011 659/0GA PC$4.75/MF$2.25
Minnesota Univ Minneapolis Dept of Aerospace Engineering and Mechanics
On Nonlinear Gyroscopic Systems.
Interim rept.,
P. R. Sethna, and M. Balu Balachandra. 1974, 95p AFOSR-TR-75-0848
Grant AF-AFOSR-2284-72

Descriptors: *Gyroscopes, *Equations of motion, Nonlinear systems, Matrices(Mathematics), Hamiltonian, Computations, Theorems, Partial differential equations.

Nonlinear gyroscopic systems are studied in two basic cases. In one case the motions are studied in the neighborhood of known linear motions and the systems are regarded as weakly nonlinear. In the other case the motions are studied in the case when there is no restriction on the size of the nonlinear terms but it is assumed that the conserved momenta or angular volocities of the gyroscopes take large values.

N75-22309/9GA PC$3.75/MF$2.25
Laboratoire de Recherches Balistiques et Aerodynamiques, Vernon (France). Service Systemes Inertiels et Electroniques.
Program Diabo: Calculation of Gyroscopic Drifts DX, and Dy, and Dz in the Laboratory for Three Inertial Platforms in Navigation Modes Notice du Programme Diabo. Calcul des Derives Gyroscopiques DX, Dy et Dz de

Trois Plates-Formes Inertielles en Mode Navigation dans UN Laboratoire.
M. Mouton. 24 Oct 74, 43p LRBA-E-307-NT-67/SEY
Language in French.

Descriptors: *Computer programs, *Gyroscopic stability, *Inertial platforms, *Nonlinear filters, *Runge-kutta method, Data acquisition, Inertial navigation, Instrument errors, Transfer functions, Univac computers.

For abstract, see STAR 1314

N75-22310/7GA PC$4.75/MF$2.25
European Space Research Organization, Paris (France).
Statistical Studies on the Accuracy of Carousel 4 Inertial Navigation Systems after Flights over the North Atlantic.
O. Weber. Feb 75, 82p ESRO-TT-136, DLR-MITT-74-10
Tran-Transl. Into English of "Statistische Untersuch. Ueber die Genauigkeit von Traegheitsnavigationsanlagen Carousel 4 Nach Nordatlantikfluegen" Dfvlr, Porz, West Ger. Report Dlr-Mitt-74-10, 31 Jan. 1973. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 17 Dm.

Descriptors: *Accuracy, *Inertial navigation, *Position errors, *Position indicators, Air navigation, Atlantic ocean, Data acquisition, International cooperation, Statistical analysis.

For abstract, see STAR 1314

N75-22335/4GA PC$4.25/MF$2.25
Princeton Univ., N.J. Flight Research Lab.
The Landing Flare: An Analysis and Flight-Test Investigation.
E. Seckel. May 75, 57p NASA-CR-2517
Contract NAS1-11231

Descriptors: *Flight tests, *Landing aids, *Runway lights, Aircraft control, Aircraft performance, Flight characteristics, Ground effect.

For abstract, see STAR 1314

N75-23390/8GA PC$3.25/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Scheepsbouw Afdeling.
Progress and Developments of Ocean Weather Routing.
C. Dewit. Nov 74, 25p REPT-201-S, TDCK-65701

Descriptors: *Oceans, *Routes, *Ships, Navigation aids, Time, Traffic control, Weather forecasting.

For abstract, see STAR 1314

17H. Optical Detection

AD-A011 150/0GA PC$7.50/MF$2.25
Dayton Univ Ohio Research Inst
Maximum Likelihood Solution to Theodolite Data.
Contract rept.,
Lawrence A. Jehn, and Jerry B. Reeves. May 75, 236p NSWC/DL-CR-71-100
Contract N00178-70-C-0056

Descriptors: *Theodolites, *Data processing, *Computer programs, Optical tracking, Matrices(Mathematics), Partial differential equations, Digital computers, Computations.
Identifiers: Maximum likelihood estimation, FORTRAN 4 programming language, IBM 7094 computers, IBM 7030 computers.

Theodolite procedures are briefly reviewed and the method by Dr. C. J. Cohen of the Naval Surface Weapons Center, Dahlgren Laboratory is discussed in detail. Errors of closure of the individual solution points are calculated. A criterion for the rejection of erroneous data from individual theodolite stations is included. Statistical procedures are included which establish a reliable estimate of the variance of the position coordinates based on the errors of closure of the solution points. A FORTRAN 4 program is described which has a number of options which makes it convenient for the user to adapt it to his particular needs. A unique feature is the tabulator plot of the errors of closure. The program is operational on the IBM 7094 and 7030 systems.

AD-A011 572/5GA PC$3.25/MF$2.25
Multi-Tech Associates Dayton Ohio
Effects of Colored Lenses on Visual Performance.
Final rept. 1 Feb 73-30 Jan 74,
Robert S. Hart. Jul 74, 23p AMRL-TR-74-38
Contract F33615-73-C-4105

Descriptors: *Optical filters, *Eyeglasses, *Lenses, *Target detection, Visual surveillance, Air to surface, Colors, Performance tests, Aerial reconnaissance, Yellow, Red, Gray.
Identifiers: *Sunglasses.

This study compares operator target detection performance while wearing red, yellow and gray sunglass lenses and unaided viewing. A research task was performed outdoors using survival orange targets located at ranges of 1600 feet to 4500 feet from the subjects. No statistically significant performance differences were obtained although subjectively the operators preferred the yellow lenses over the gray sunglasses and unfiltered conditions.

N75-22939/3GA PC$3.25/MF$2.25
Old Dominion Univ. Research Foundation, Norfolk, Va.
A Theoretical/Experimental Program to Develop Active Optical Pollution Sensors, Part 2.
Final Report.
S. K. Poultney. May 75, 17p NASA-CR-142727
Contract NGR-47-003-087

Descriptors: *Optical radar, *Pollution monitoring, *Sensors, Backscattering, Calibrating, Gas detectors, Remote sensors.

For abstract, see STAR 1314

PAT-APPL-563 252/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
System for Simulating Missile Target Motion Using Steering Mirrors.
Patent Application,
Richard P. Pledger. Filed 28 Mar 75, 10p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Guided missile targets, *Target position indicators, Simulation, Gimbals, Mirrors, Alignment, Patents.
Identifiers: *Patent applications, PAT-CL-350-299.

The patent application relates to a system for reflecting a collimated beam of radiation with two mirrors including a gimbal mount, steering rod, an articulated spatial parallelogram linkage for one mirror, a pivot joined to one joint of the parallelogram for the second mirror and a pivoted frame and parallelogram mechanism for supporting the mirrors.

17I. Radar Detection

AD-A011 122/9GA PC$3.75/MF$2.25
Naval Research Lab Washington D C
Adaptive Tracking Algorithm.
Interim rept.,
Ben H. Cantrell. Apr 75, 43p Rept no. NRL-MR-3037

Descriptors: *Radar tracking, Algorithms, Control theory, Moving targets, Analysis of variance, Transfer functions, Adaptive systems, Search radar.
Identifiers: Filtering theory, Adaptive filters.

An adaptive tracking algorithm is developed which provides heavy smoothing when the target is not maneuvering. When the target turns, the filter bandwidth opens so as to allow the track filter to follow the turn. The algorithm is simple to implement and also works for detections occurring non-uniformly in time.

AD-A011 132/8GA PC$3.75/MF$2.25
Naval Surface Weapons Center Dahlgren Lab Va
Computation of Positions of Doppler Satellite Observing Stations.
Technical rept.,
Larry K. Beuglass. Jun 75, 39p Rept no. NSWC/DL-TR-3173

Descriptors: *Doppler radar, *Radar tracking, *Satellite tracking systems, Trajectories, Computer programming, Computations.

A computer program is described which forms and solves normal equations for station position and bias parameters. The satellite observations are obtained from the geoceiver, a lightweight Doppler tracking equipment. The orbit of the satellite is held fixed in the computations. A single pass solution for longitude and latitude as well as a three-dimensional solution for longitude, latitude, and height is computed. The program also includes segments for filtering the data, correcting for ionospheric and tropospheric refraction, and navigating the station in the plane of the satellite velocity vector and station position.

AD-A011 312/6GA PC$3.25/MF$2.25
Florida Univ Gainesville Engineering and Industrial Experiment Station
Ambiguity Function Measurement.
Technical rept.,
Marion C. Bartlett, Leon W. Couch, and Raymond C. Johnson. Jun 75, 15p HDL-CR-75-039-6
Contract DAAG39-74-C-0039

Descriptors: *Radar signals, *Frequency modulation, Doppler effect, Continuous waves, Spectrum analyzers, Fourier transformation, Sine waves, Noise.
Identifiers: *Ambiguity functions.

It is shown that the magnitude of the ambiguity function can be easily displayed on a spectrum analyzer. The technique employs delay lines operating only on the modulation waveform. Examples of measured ambiguity functions are given for FM by noise and by sine waves. These results are shown to be in agreement with theory.

AD-A011 393/6GA PC$4.25/MF$2.25
Ail Deer Park N Y
Test Report on an Experimental Low-Angle Tracking Subsystem for An/FPS-16 Radar.
Final rept. Aug 71-Dec 74,
B. V. Popovich, R. van Deusen, and S. J. Stanton. Dec 74, 74p Rept no. AIL-5421-1
Contract N00014-72-C-0110

Descriptors: *Radar tracking, Low angles, Antenna arrays, Beam forming, Signal processing, Search radar, Performance tests.
Identifiers: AN/FPS-16.

The report describes tests of a new Low-Angle Tracking (LAT) radar technique which uses a vertical antenna array to provide elevation

coverage of the region from the horizon to one beam width above the horizon. A beam-forming network behind the array derives the ratio of the signals in two beams. Be design, this ratio is proportional to target elevation angle. The image signal entering the antenna is processed with the target signal in such a way that the system performance is not affected by the presence of the image signal. This process enables the radar to track targets in elevation in the low-angle region. An experimental LAT subsystem was designed that implements the ratio technique. The LAT subsystem was interfaced with an AN/FPS-16 tracking radar at the NRL facility at Chesapeake Beach, Maryland. Tracking data was collected in the low-angle region that indicates elevation accuracies between 1/10 and 1/15 of a beam width. The experiment, supporting theory, and data are presented in the body of the report.

AD-A011 557/6GA PC$3.75/MF$2.25
Dayton Univ Ohio
Aircraft Track Initiation and Maintenance in a Single-Operator Simulated Surveillance System: Technical Report III.
Final rept.,
Robert G. Mills, and Michael A. Bauer. Mar 74, 27p Rept no. AMRL-TR-73-70
See also Technical report no. 2, AD-741 902.

Descriptors: *Radar tracking, *Man machine systems, Semiautomatic, Target detection, Aircraft, Simulation, Computer applications, Radar clutter, Display systems, Performance tests.
Identifiers: Time compression, Radar track reinitiation.

A semiautomatic radar surveillance system using a time-compression mode for display of real-time radar data was simulated. Subjects were required to detect targets entering a surveillance area of 300 by 300 nautical miles, initiate automatic tracking of these targets, and reinitiate: maintain lost tracks when automatic tracking failed. Three target introduction rates, two levels of clutter density, and three levels of target velocity were investigated.

PAT-APPL-563 009/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Method and Apparatus for Improving the Slowly Moving Target Detection Capability of an AMTI Synthetic Aperture Radar.
Patent Application,
William B. Goggens, Jr.. Filed 27 Mar 75, 17p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Synthetic aperture radar, *Moving target indicators, Patents, Airborne, Radar clutter, Cancellation, Signal processing.
Identifiers: *Patent applications, PAT-CL-343-7-7.

The patent application describes detection of slowly moving and stationary targets that are normally obscured by ground clutter accomplished by an AMTI synthetic aperture radar system that uses multiple receiving antennas mounted along the flight velocity vector of the radar bearing aircraft. Each antenna is separated by a distance d from each other. Synthetic arrays are formed by processing the radar returns from each antenna terminal. The radar PRF is controlled so that the aircraft flies a distance d during the interpulse period. The synthetic array outputs of adjacent pairs of antennas are subtracted to provide clutter cancellation. The resulting outputs from adjacent terminals can be used in a monopulse mode for angular discrimination.

PATENT-3 879 731 Not available NTIS
Department of the Air Force Washington D C
Impedance Load for Radar Target Cross Section Control Element.
Patent,
Richard B. Mack. Filed 22 Nov 71, patented 22 Apr 75, 4p Rept nos. PAT-APPL-201 233,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Radar cross sections, *Patents, Control, Impedance, Loading(Electronics).
Identifiers: PAT-CL-343-18-B.

The patent relates to radar target cross section control achieved by antenna elements that are terminated by impedance loads whose impedance values decrease with increasing incident electromagnetic wave frequency. An impedance load that accomplishes this over a wide frequency band and that uses only passive elements is disclosed. It comprises a length of transmission-line terminated in its own characteristic impedance and having a multiplicity of reflector elements disposed along its length. The reflector elements are geometrically spaced and electrically tuned such that maximum reflection (or scattering) of electromagnetic waves occurs at points progressively closer to the load input terminal as electromagnetic wave frequency increases.

17J. Seismic Detection

AD-A011 361/3GA PC$4.25/MF$2.25
Teledyne Geotech Alexandria Va Seismic Data Analysis Center
Average P and PKP Codas for Earthquakes (118-180 degrees).
Technical rept.,
E. I. Sweetser, and T. J. Cohen. 28 Oct 74, 75p Rept no. SDAC-TR-74-19
Contract F08606-74-C-0006

Descriptors: *Seismic detection, *Underground explosions, Seismological stations, Earthquakes, Nuclear explosions, Seismic waves, Ground motion, Seismographs, Intensity, Epicenters.
Identifiers: Vela Uniform, Earthquake coda.

The report presents results of analysis of 87 seismograms from small events (m sub b) = or < 5.8) recorded at 21 world-wide stations, 8 LRSM stations, and 3 observatories, and of 112 large-event ((m sub b), (M sub s), or secondary (m sub b) = or > 7.0) seismograms recorded at 34 world-wide stations, 10 LRSM stations, and one observatory. These results, together with other coda data previously reported, confirm previous conclusions that the greater the event magnitude, the higher is the relative amplitude level for elapsed times greater than about 20 seconds into the coda. The mean difference between large-event and small-event codas in the distance interval 42-180 degrees is 0.16 (m sub b) units. Because relative coda level at a given time after arrival onset is a function of magnitude, at least two sets of coda determinations are required, one each for large and small events in distance intervals specified between 118 and 180 degrees.

AD-A011 370/4GA PC$3.25/MF$2.25
Ensco Inc Springfield Va
Determination of Seismic Source Depths from Differential Travel Times.
Quarterly rept. 1 Nov 74-31 Jan 75,
Edward Page. May 75, 15p
Contract F08606-75-C-0025, ARPA Order-1620

Descriptors: *Seismic detection, *Underground explosions, Seismic waves, Earthquakes, Nuclear explosions, Signal processing, Statistical analysis, Matched filters, Spectrum signatures.
Identifiers: Vela Uniform, Illinois shot, Cepstrum technique.

The objective of the current project is to improve seismic depth phase detection by exploiting information contained in the seismic coda. During the first quarter of this project the author has analyzed a well-understood event and demonstrated that depth phase detection can be enhanced through proper analysis of the seismic coda. Also indicated is how a cepstrum matched filter technique can automate the interpretation of the computed cepstrum and extract depth phase estimates.

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

PB-242 417/4GA PC$4.25/MF$2.25
Electric Power Research Inst., Palo Alto, Calif.
Laser-Fusion Program. Summary Report.
Special rept.,
L. K. Isaacson. Feb 75, 52p* EPRI-SR-9

Descriptors: *Nuclear fusion, *Laser beams, Gas lasers, Implosions, Deuterium, Tritium, Plasmas(Physics).
Identifiers: Neodymium lasers.

A brief summary of the ERDA Laser-Fusion Program and a brief review of several major laboratory programs in the Laser-Fusion Program are presented. In addition, comments are made on laser development efforts and laser-fusion power systems analyses. The major laboratories engaged in laser-fusion research are driving on definitive measurements to show the scientific feasibility of the laser-driven implosion process as a technique for achieving thermonuclear fusion.

18C. Nuclear Explosions

N75-22338/8GA PC$5.25/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Experiments on the Simulation of Atomic Explosion Shock Waves and on the Propagation of Such Shock Waves in Tubes Versuche Zur Simulation von Luftstosswellen bei Atomexplosionen und Zur Fortpflanzung Solcher Wellen in Rohren.
M. Froboese, H. P. Mehlin, G. Mathieu, and G. Parmentier. 11 Apr 74, 117p ISL-13/74
Contract DTEN-72.170
Subm-Sponsored in Part by Bundesmin. Fuer Verteidigung Prepared Jointly with Ernst-Machinst.
Language in German.

Descriptors: *Nuclear explosions, *Shock tubes, *Shock wave propagation, *Shock waves, Air, Compressed gas, Detonation, Methane, Oscillographs, Pressure distribution, Pressure measurements, Temperature distribution.

For abstract, see STAR 1314

18D. Nuclear Instrumentation

AD-A011 272/2GA PC$3.25/MF$2.25
Defence Research Establishment Ottawa (Ontario)
A Portable X- and Gamma-Ray Monitor.
Technical note,
P. C. East. Mar 75, 14p Rept no. DREO-TN-75-7

Descriptors: *Radiation monitors, *Gamma rays, *X rays, Portable equipment, Canada.

A Portable X- and gamma-radiation monitor, using the Cutie Pie configuration, is described which covers the exposure-rate range 0.2 mR/h

to 10 R/h. This relatively low cost instrument which is powered by a single 'D' size battery is rugged and simple to use.

AD-A011 601/2GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Interface Dose as a Function of Angle of Incidence for Aluminum-Gold and Aluminum-Beryllium Slabs.
Physical sciences research papers,
L. F. Lowe, W. C. Taylor, and J. R. Cappelli. 11 Apr 75, 9p Rept nos. AFCRL-PSRP-629, AFCRL-TR-75-0206

Descriptors: *Dosimeters, *Gold, *Aluminum, *Beryllium, Interfaces, Gamma rays.
Identifiers: Thermoluminescent dosimetry, Angle of incidence.

The effect of Co-60 gamma ray incidence angle on dose enhancement at interfaces of dissimilar materials has been measured. Materials studied were gold, aluminum, and beryllium. Maximum enhancement was found at normal incidence with the low atomic numbered material facing the radiation source and the minimum at 180 degrees. The experimental results were compared to Monte Carlo calculations at lower energies.

18E. Nuclear Power Plants

PB-242 164/2GA PC$4.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
The Future of the U.S. Nuclear Energy Industry,
Paul L. Joskow, and Martin L. Baughman. Apr 75, 59p* MIT-EL-75-006 NSF/RA/N-75-033
Grant NSF-SIA73-07871-A02

Descriptors: *Nuclear electric power generation, *Electric power demand, Electricity, Fuel oil, Natural gas, Coal, Residential buildings, Commercial buildings, Industrial buildings, Industries, Econometrics, Economic models, Simulation, Uranium, Electric utilities, Nuclear reactors, Forecasting, Off peak energy storage.

A regional supply-demand-regulatory model of the U.S. electric utility industry is used to evaluate the derived demand for commercial nuclear reactors, raw uranium, and enrichment requirements for the period 1975-1995. The report briefly sketches the structure of the domestic nuclear energy industry, describes the engineering-econometric supply-demand system used for the analyses, and reports the conclusions of analysis for alternative assumptions about air quality regulations, peak-load pricing, costs of uranium resources, and future costs of capital to the electric utility industry.

PB-242 533/8GA PC$4.25/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Office of Nuclear Reactor Regulation.
Safety Evaluation Related to Construction of Fulton Generating Station Units 1 and 2 Philadelphia Electric Company, Supplement No. 1. Docket Nos. 50-463 and 50-464.
Jun 75, 59p NUREG-75/015(Supp.1)
See also report dated Mar 75, PB-239 747.

Descriptors: *Nuclear reactor safety, *Nuclear power plants, *Site selection, Radiation hazards, Land use, Ecology, Gas cooled reactors, Nuclear power plants, Design criteria, Nuclear reactor coolants, Nuclear reactor engineering, Safety engineering, Nuclear reactor containment, Nuclear reactor control elements, Nuclear fuels, Pennsylvania.
Identifiers: Fulton nuclear power plant, Lancaster County(Pennsylvania).

The document presents supplement no. 1 to the Safety Evaluation Report for licenses to construct and operate the proposed Fulton Generating Station, Units 1 and 2, to be located in Fulton and Drumore Townships, Lancaster County, Pennsylvania. The supplement consists of the staff's evaluation of additional information. It also discusses items recommended for consideration by the Advisory Committee on Reactor Safeguards.

PB-242 717/7GA PC$8.50/MF$2.25
Nuclear Regulatory Commission, Washington, D.C. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to Construction of Pilgrim Nuclear Generating Station, Unit No. 2, Boston Edison Company, et al, Docket No. 50-471.
Safety evaluation rept.
Jun 75, 274p NUREG-75/054

Descriptors: *Nuclear reactor safety, *Nuclear power plants, Population density, Land use, Industrial plants, Safety engineering, Accident prevention, Nuclear reactor engineering, Design criteria, Pressurized water reactors, Radiation hazards, Nuclear fuels, Radioactive wastes, Massachusetts.
Identifiers: Pilgrim nuclear power plant, Plymouth County(Massachusetts).

The safety evaluation consists of a technical review and staff evaluation of applicants' information on: (1) population density, land use, and physical characteristics of the site area; (2) design, fabrication, construction, testing criteria, and performance characteristics of plant structures, systems, and components important to safety; (3) expected response of the facility to anticipated operating transients, and to postulated design basis accidents; (4) applicants' engineering and construction organization, and plans for the conduct of plant operations; and (5) design criteria for a system to control the plant's radiological effluents. The staff has concluded that the plant can be constructed by the Boston Edison Company et al. without endangering the health and safety of the public provided that the outstanding matters discussed in the report are favorably resolved. The nuclear generating station is located in Plymouth County, Massachussetts.

18F. Radiation Shielding and Protection

AD-A011 133/6GA PC$4.25/MF$2.25
Radiation Research Associates Inc Fort Worth Tex
System of Ship-Shielding Codes INRADS.
Final rept. 18 Apr 73-30 Jun 74,
J. M. Newell, L. G. Mooney, and R. B. Livesay. 22 May 75, 75p Rept no. RRA-T7410 DNA-3538F
Contract DNA001-73-C-0211

Descriptors: *Naval vessels, *Radiation shielding, Nuclear warfare, Fallout, Vulnerability, Computer programming, FORTRAN, Computations.
Identifiers: INRADS computer code, CDC 6600 computers.

A system of three machine codes was developed to calculate the protection against initial radiation from nuclear weapons that may be afforded aboard ship. The codes are written in FORTRAN and are operational on the CDC 6600 computer using SCOPE 3.4 software.

AD-A011 360/5GA PC$3.75/MF$2.25
Radiation Research Associates Inc Fort Worth Tex
Initial Nuclear Radiation Support Studies.
Final rept. 1 Jul 73-30 Jun 74,
L. Glenn Mooney, and Ronald L. Swanson. Jul 74, 43p Rept no. RRA-T7411
Contract DAHC20-72-C-0123
See also report dated Dec 72, AD-760 345.

Descriptors: *Nuclear explosions, *Radiation shielding, Nuclear fireball, Overpressure, Structural members, Shock waves, Neutron transport theory, Gamma rays, Computations.

The energy-and-angle distribution of fission-product gamma rays from three nuclear weapon detonations has been calculated for burst elevation angles of 5 degrees, 15 degrees, and 30 degrees from a point on the ground at which 30 PSI would occur. All weapon yields were 300 KT, 50/50 fission/fusion. (One detector for each burst was located 1 meter above the ground at a distance corresponding to an overpressure of 30 PSI.) The effects of debris cloud rise and expansion, source decay, volume source, fireball density, and hydrodynamic enhancement were included. Ground effects were included for fireball and gamma-ray transport perturbations. Ground effects on the shock front were included by instantaneously doubling the yield for shock propagation for the 5 degrees and 15 degrees burst elevation angles. The ground was ignored for effects on shock for the 30 degrees burst elevation case. Output consists of the energy-and-polar-angle distribution of gamma rays relative to the initial burst-point to detector axis. The azimuthal-dependent fluence was also calculated but the data are not reported here due to the large size of the arrays.

18I. Reactor Engineering and Operation

AD-A011 355/5GA PC$4.75/MF$2.25
George Washington Univ Washington D C Inst for the Study of Fatigue Fracture and Structural Reliability
Reliability of Reactor Components and Systems Subject to Fatigue and Creep.
Technical rept.,
Alfred M. Freudenthal. Jan 74, 82p Rept no. TR-17
Contract N00014-67-A-0214-0011

Descriptors: *Nuclear power plants, *Reliability, *Risk, Reactor system components, Reactor materials, Structural members, Failure, Fatigue, Creep, Statistical analysis.

The physical-probabilistic basis for the reliability assessment of structural parts operating at elevated temperatures and therefore subject not only to fatigue -- but also to creep-damage or to a combination of both is developed and discussed. The importance of order-statistics concepts and, in particular, of extreme value distributions in structural reliability analysis is demonstrated. Diagrams facilitating the practical application of the developed concepts in this analysis are presented.

PB-242 397/8GA PC$4.75/MF$2.25
Energy, Inc., Idaho Falls, Idaho.
Analysis of GE BWR Blowdown Heat Transfer Program, Test 4906 (AEC Standard Problem Four).
Final rept.,
K. V. Moore, C. M. Moser, C. E. Peterson, R. T. Fernandez, and K. A. Nilsson. Jan 75, 78p EPRI-280-FR

Descriptors: *Nuclear reactor accidents, *Nuclear reactor coolants, Critical flow, Computer programming, Nuclear fuel pins.
Identifiers: *Loss of coolant, RELAP4 computer program.

Standard Problem Four is the fourth problem from a series of Loss-of-Coolant Accident (LOCA) problems developed by the AEC for the evaluation and comparison of computational techniques used to predict the blowdown phase of Light Water Reactors (LWR's) during nonstandard operational conditions. Among the parameters to be calculated are differential

pressures at strategic positions, the steam dome pressure, the drive pump speed for the intact recirculation loop, the fluid densities, several mass flow rates, heater rod temperatures, the residual fluid mass remaining in the lower plenum at 45 seconds, and the mixture level in the lower plenum. The computer code used for this analysis is the RELAP4 code with appropriate changes to provide a more realistic prediction of the experimental results.

18J. Reactor Materials

AD-A011 257/3GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Moisture Migration in Concrete.
Final rept.,
James E. McDonald. May 75, 77p Rept no. AEWES-TR-C-75-1

Descriptors: *Reactor materials, *Pressure vessels, *Prestressed concrete, Moisture, Drying, Humidity, Temperature control, Hydration.
Identifiers: *Moisture migration.

In an effort to obtain information regarding the nature of moisture movement and rate of moisture loss in a prestressed concrete reactor vessel (PCRV), an experimental study of moisture migration in a pie-shaped specimen representing the flow path through a cylindrical wall of a PCRV was initiated. After casting of the test specimen, temperature distribution, shrinkage, and moisture distribution were monitored for approximately 510 days. After this initial monitoring, a temperature difference of 80 F was applied to the specimen, and the above-mentioned measurements were continued for an additional test period of one year. Results indicate that moisture migration in thick sections of concrete, such as a PCRV, is a slow process and is not likely to be a significant factor with temperature differences of 80 F or less.

PB-242 414/1GA PC$3.25/MF$2.25
Electric Power Research Inst., Palo Alto, Calif.
EPRI Programs on Plutonium Fuel Utilization.
Special rept.,
B. A. Zolotar, M. E. Lapides, and F. E. Gelhaus. Feb 75, 13p EPRI-SR-6
Presented at the International Atomic Energy Agency Panel on Plutonium Utilization in Thermal Power Reactors, Karlsruhe, 25-29 Nov 74.

Descriptors: *Plutonium, *Nuclear fuel cycles, Water cooled reactors, High temperature gas cooled reactors, Costs.

EPRI has initiated a plutonium recycle program with a goal of providing a technical base for the industry to consider in choosing among the various available alternatives. Basic criteria for Pu recycle will be made by the individual user, subject to United States government requirements. The use of Pu generated during thermal reactor operation will require assessments of several alternatives, including: (1) recycle of Pu in water reactors designed for uranium-bearing cores; (2) recycle of Pu in water reactors specially designed for or adaptable to large-scale Pu usage; (3) use of Pu as a fissile makeup or startup material in present HTGR's, or as the major fuel in an HTGR designed as a Pu 'burner'; (4) storage of spent fuel or recovered Pu; and (5) sale of Pu if a market develops.

18K. Reactor Physics

N75-23262/9GA PC$3.25/MF$2.25
Technical Research Centre of Finland, Helsinki. Nuclear Engineering Lab.
Curved Low Order Angular Elements in Two Dimensional Neutron Transport Problems.
P. Silvennoinen, and J. Tuominen. 1974, 14p PUBL-8

Descriptors: *Angular distribution, *Boltzmann transport equation, *Curves (Geometry), *Neutrons, *Two dimensional flow, Finite element method, Linear equations, Neutron distribution, Neutron flux density, Polynomials.

For abstract, see STAR 1314

PB-242 415/8GA PC$3.75/MF$2.25
Electric Power Research Inst., Palo Alto, Calif.
THERM: Transient Thermal Analysis of a Nuclear Fuel Rod.
Special rept.,
Rodney R. Gay. Mar 75, 35p EPRI-SR-7

Descriptors: *Nuclear fuel rods, *Nuclear reactor coolants, *Nuclear reactor reactivity, *Heat transfer, Finite difference theory, Conduction, Convection, Computer programs, Computation, Nuclear reactor safety.
Identifiers: THERM computer program, FORTRAN 4 programming language.

THERM is a finite difference conduction-convection computer program, written in FORTRAN, designed to predict the transient thermal response of a reactor fuel rod and coolant channel to reactivity or flow perturbations. Stability and speed were the most important criteria in its design. THERM consists of six subroutines and a main program. All computational work is done in the subroutines. The major program serves to call in the subroutines in their proper sequence and print out the results. The calculation of the system temperatures in a given time increment in the THERM program proceeds in two distinct steps. First the outlet coolant temperatures are calculated explicitly for each axial section. Then these temperatures are input to an implicit formulation, which computes the system nodal temperatures.

18M. Reactors (Non-Power)

AD-A011 209/4GA PC$3.25/MF$2.25
California Inst of Tech Pasadena
Nonlinear Oscillations in a Reactor with Two Temperature Coefficients,
James P. Keener, and Donald S. Cohen. 15 Mar 74, 7p ARO-7625.36-M
Contract DAHC04-68-C-0006, Grant NSF-GP-18471
Availability: Pub. in Nuclear Science and Engineering, 56 p354-359 1975.

Descriptors: *Oscillation, *Nuclear reactions, Nonlinear systems, Perturbations, Temperature, Feedback, Coefficients, Reprints.
Identifiers: Two temperature reactors, Multitime scale perturbation method.

A multi-scale perturbation method for studying nonlinear oscillations and their stability in higher order systems is developed. The technique is applied to the two-temperature reactor model. Stability boundaries involving the various parameters are established and easily interpretable analytical expressions for nonlinear oscillations are presented. The method requires neither phase plane systems nor autonomous equations and thus provides an analytical tool for investigating higher order and space dependent reactor models. (Author)

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A011 310/0GA PC$4.25/MF$2.25
Mrc Corp Baltimore Md
Conception of New Techniques and Equipment for the Production of Non-Electric Detonators.
Final rept.,
Nathan D. Isaacs. 7 May 75, 68p Rept no. MRC-624-F
Contract DAAA21-73-C-0101

Descriptors: *Detonators, *Industrial production, Lead azides, RDX, Presses(Machinery), Loading(Ordnance projectors).
Identifiers: M-55 detonators.

A program was conducted to conceive new techniques and equipment for the production of non-electric detonators at the rate of 1200 per minute. An engineering study was conducted of the operations required for loading the M55 non-electric detonator and performed material response testing on the three explosives (RDX, lead azide, NOL 130). A bench model rotary loading press, identical in design to a production machine, was designed and fabricated, and live loading runs were performed. Successful test runs were made with all three explosives. The ability to produce a uniform product in accordance with the M55 drawing requirements at the desired production rate was demonstrated.

N75-22457/6GA PC$3.75/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Investigation on the Piezoelectricity of Explosives Untersuchung von Explosivstoffen Auf Piezoelektrizitaet.
H. H. Licht, and M. Schwertl. 1 Apr 74, 29p ISL-18/74
Language in German.

Descriptors: *Explosives, *Piezoelectric crystals, *Piezoelectricity, Crystal lattices, Dynamic loads, Electric bridges, Static loads.

For abstract, see STAR 1314

N75-22468/3GA PC$3.75/MF$2.25
Explosives Research and Development Establishment, Waltham Abbey (England).
Rheological Characterisation of Plastic Propellant by Extension under Constant Load.
W. A. Dukes. Jan 74, 33p ERDE-TR-154, BR42768

Descriptors: *Elongation, *Loads (Forces), *Plastic propellants, *Rheology, Flow equations, Parallel plates, Plastic flow, Shear stress, Stress-strain diagrams, Tensile creep, Tensile deformation, Time dependence.

For abstract, see STAR 1314

N75-22469/1GA PC$4.25/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Shock Wave Sensitivity of Powdered Hexogen Sensibilite a l'Onde de Choc de l'Hexogene Pulverulent.
Y. Delongueville, H. W. Koch, and L. Philipp. 4 Jun 74, 56p ISL-20/74
Contract SNPE-14/73/D
Language in French.

Descriptors: *Explosives, *Granular materials, *Hexogenes (Trademark), *Impact resistance, *Shock waves, Compression tests, Density (Number/volume), Energy transfer, Particle size distribution, Pressure effects.

For abstract, see STAR 1314

PAT-APPL-559 860/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
High Density Armor Piercing Projectile.
Patent Application,
Irwin Barr. Filed 19 Mar 75, 10p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Armor piercing ammunition, *Penetration, Depleted uranium, Rods, Spin stabilization, Aerodynamic stability, Patents.
Identifiers: *Patent applications, PAT-CL-102-52, Penetrators.

The patent application relates to a high density armor piercing projectile having a cylindrically-shaped penetrator core. The core has a length substantially greater than the diameter thereof. Encompassing the penetrator is a carrier body and nose. The carrier body being press fit on the penetrator core and having a stabilizing ring press fit thereon. An obturator and pusher plate are secured to the rear of the penetrator core. In addition, the design of the carrier body enables the projectile to be spin stabilized when fired from any suitable weapon.

PATENT-3 878 704 Not available NTIS
Department of the Air Force Washington D C
Method of Forming Fragmentation Wrap for Explosive Weapons.
Patent,
Frank M. Shea. Filed 25 Jun 73, patented 22 Apr 75, 10p Rept nos. PAT-APPL-373 059,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Fragmentation warheads, *Fabrication, *Patents, Cutting, Pressing(Forming), Dies, Machine shop practice.
Identifiers: PAT-CL-72-326.

The patent describes a method of manufacturing fragmentation wrap which provides for the progressive flattening, controlled or preselected depth shearing and/or indenting of hot or cold rolled steel. The method fabricates a fragmentation sheet of relatively heavy gauge metal for explosive weapons having predefined fragmentation shapes formed therein.

PATENT-3 878 791 Not available NTIS
Department of the Air Force Washington D C
Encapsulated Pellet Igniter Charge.
Patent,
Herbert H. Askwith, Owen J. Buckheim, and Orville O. Henderson. Filed 17 Jan 69, patented 22 Apr 75, 5p Rept nos. PAT-APPL-792 172,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Igniters, *Pellets, *Encapsulation, *Patents, Molds(Forms), Molding techniques.
Identifiers: PAT-CL-102-101.

The patent describes a method for encapsulating pellets by means of a molding operation in order to form a molded pellet mat capable of being used as an igniter charge to be inserted within the annular cavity of an igniter.

PB-242 487/7GA PC$5.25/MF$2.25
Westinghouse Electric Corp., Bloomfield, N.J. Fluorescent and Vapor Lamp Div.
Materials Identification and Coding.
Final rept. 27 Apr 72-30 Apr 74,
Frank M. Vodoklys. Apr 74, 103p BuMines-OFR-44-75
Contract H0220049

Descriptors: *Phosphors, *Explosives, *Labeled substances, Coatings, Grains, Coding, Fluorescence, Emission spectra, Identifying.
Identifiers: Forensic chemistry.

The objective of the contract was to develop and evaluate materials and methods to achieve post-explosion identification of explosives reliably and economically through the use of phosphor-coded grains incorporated into the explosive during its manufacture. A coding system of two spotting phosphors and seven coding phosphors was successfully developed during the execution of the contract. The ability of the coded grains to survive detonation in many different types of explosives was demonstrated and the complete code was extracted from a single 100 micron post-explosion fragment. A laboratory method for manufacturing the coded grains was established and ten one-pound samples, each with a different code, were fabricated. Finally, a method was developed for applying a coating of polyethylene to the grains to prevent sensitization of the the tagged explosives.

19B. Bombs

PATENT-3 874 266 Not available NTIS
Department of the Air Force Washington D C
Weapon Dispersal System.
Patent,
Paul F. Peterson. Filed 14 Jan 74, patented 1 Apr 75, 4p Rept nos. PAT-APPL-433 174,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Low altitude bombing, *Bombs, *Dispensers, *Patents, Dispersing, Bomb ejectors, Propelling charges.
Identifiers: PAT-CL-89-1-5.

The patent describes bomb-pairs positioned in clip-in modules, mounted on rails in the bomb bay of an aircraft, having the deceleration skirts replaced by separation devices. The separation devices have a cylindrical element which acts as a piston attached to one bomb and a cylindrical element which acts as the cylinder attached to the other bomb of the bomb pair. A propellant charge is positioned within the separation device with the propellant charge igniter being operated through a time delay device.

19D. Explosions, Ballistics, and Armor

AD-A011 288/8GA PC$3.75/MF$2.25
Auburn Univ Ala Thermoscience Group
Aeroloading and Dynamics of a Conical Vehicle During Pentration of a Blast Wave.
Final rept. 1 Jan-31 Mar 74,
J. R. Dunn, A. R. Barbin, and R. I. Vachon. Apr 74, 26p
Contract DAHC60-71-C-0076

Descriptors: *Blast waves, *Aerodynamic loading, *Conical bodies, Penetration, Shock waves, Mathematical prediction, Aerodynamic characteristics, Angle of attack, Interception, Guided missiles, Nuclear explosions.
Identifiers: Blast wave entry.

The report deals with the procedure for predicting transient loads on a conical vehicle during the oblique penetration of a blast induced shock wave. The importance of this analysis is in the application of the predicted aerodynamic loads to estimate the dynamic response of the missile during the blast penetration transient.

AD-A011 493/4GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Project ESSEX I. Phase 1, Mobility Experiments.
Final rept. Aug-Oct 73,
Charles E. Green. Apr 75, 85p Rept no. WES-MP-M-75-3 DNA-PR-0008

Descriptors: *Craters, *Trafficability, *Military vehicles, *Mobility, Ejecta, Explosions, Cratering, Barriers.
Identifiers: ESSEX 1 project, M-60 tanks, M-715 trucks(1-1/4-Ton). M-113 vehicles, M-113A1 vehicles.

Project ESSEX I, Phase 1, consisted of the detonation of three 11,249-kilogram (12.4-ton) charges and on 8,981-kilogram (9.9-ton) charge of gelled nitro-methane at different depths of burial and stemming conditions at the Peason Ridge Artillery Range of Fort Polk, Louisiana, at intermittent periods from 23 August to 31 October 1973. Mobility experiments were conducted to determine the degree to which the craters and their associated ejecta fields constitute a physical barrier to the movement of military vehicles. Four terrain units in each crater and ejecta area were delineated as significant to ground mobility and described in terms of soil strength, soil moisture content, surface configuration, ejecta depth, and areal extent.

PB-242 224/4GA PC$7.00/MF$2.25
Maryland Univ., College Park. Dept. of Mechanical Engineering.
A Review of Factors Affecting Damage in Blasting,
Anders Ladegaard-Pedersen, and James W. Dally. Jan 75, 179p* NSF/RA/T-75-016
Grant NSF-GI-39320

Descriptors: *Urban areas, *Blasting, Blast loads, Overpressure, Shock waves, Elastic waves, Cratering, Noise(Sound), Psychological effects.
Identifiers: *Ground motion.

An extensive review is presented of four different characteristics of blasting which can produce damage to inhabitants, vehicles, or structures in urban areas. These include the air blast wave and the noise associated with the venting of the charge, the stress waves propagating into adjacent regions producing ground vibration, and the debris ejected from the crater or bench face when the bore hole is over-charged. Each of these four different features which can produce damage is treated separately. Fundamental relations are reviewed in each case and, where possible, explicit theoretical results are presented in terms of scaled parameters which permit predictions to be made for any size charge.

PB-242 366/3GA PC$3.75/MF$2.25
Maryland Univ., College Park. Dept. of Mechanical Engineering.
Application of Holography to a Study of Wave Propagation in Rock.
Rept. for 1 Apr-1 Nov 74,
D. C. Holloway, and A. M. Patacca. Jan 75, 40p NSF/RA/T-75-017
Grant NSF-GI-39320

Descriptors: *Blasting, *Granite, *Earth movements, Displacement, Surface waves, Seismic waves, Ruby lasers, Holography, Rock mechanics.
Identifiers: *Ground motion, *Interferometric holography.

Double exposure holography using a pulsed ruby laser was employed to record the surface displacements in westerly granite rock models of a half space. The explosive excitation was produced by 100 to 200 mg of lead azide on the free surface of the specimens. Mirrors were used so that three widely separated views of the surface were obtained thus allowing for the solution of the u, v, and w displacements corresponding to a x, y, z axis on the rock face. A radial line from the explosive center was analyzed in detail and the solution was correlated with theory.

19F. Guns

AD-A011 240/9GA PC$3.25/MF$2.25
Army Infantry Board Fort Benning Ga
Optimization of Target Exposure Times.
Final rept. Jun 1974-Jan 75,
William J. Owen. Jan 75, 24p
Report on Methodology Investigation.

Descriptors: *Targets, *Rifles, *Firing tests(Ordnance), *Time studies, Exposure(General), Daylight, Optimization, Statistical analysis, Kill probabilities.
Identifiers: *Target exposure times.

The purpose of the investigation was to standardize target exposure times to be used in daylight testing of rifles fired in the semi-automatic mode on the Infantry Board's instrumented defense firing facility. Further, the study was to define minimum exposure times that should reduce total test execution time--reduction in manhours, operating times of sophisticated and unsophisticated equipment--without sacrificing viable observations. The investigation used actual test data, determined the mathematical distribution of time to first hit in each of seven range bands, and used statistical inference techniques in determining exposure times.

AD-A011 258/1GA PC$3.25/MF$2.25
Watervliet Arsenal N Y
Metallurgical Comparison of 5 Inch/54 Naval Tubes Fired with Naco and Pyro Propellant.
Technical rept.,
Richard Griffin. Apr 75, 13p Rept no. WVT-TR-75017

Descriptors: *Gun propellants, *Gun barrels, *Metallography, Rifling, Erosive burning, Thermal stability, Hardness, Microstructure.

The effects of two different types of propellant on the surface damage introduced in the 5 inch/54 cannon tube are compared. Based on metallurgical and hardness examination, it is shown that the depth of the damage zone is greater with the Pyro as compared to the Naco propellant. This is related to the higher flame temperature of the former. The type of damage observed is described and discussed.

AD-A011 259/9GA PC$3.75/MF$2.25
Picatinny Arsenal Dover N J
Forces on a Sabot in the Gun Bore--A Computer-Aided Design Tool.
Technical rept.,
N. Pudliener, and E. Barrieres. Mar 75, 35p Rept no. PA-TR-4734

Descriptors: *Gun barrels, *Sabot projectiles, *Computer aided design, Pressure, Interior ballistics, Sabots, FORTRAN, Computer programs.
Identifiers: FORTRAN 4 programming language, CDC 6500 computers.

This report describes a computer program which computes the static loads and moments or a sabot segment while under the in-bore environment. The physical characteristics of the sabot segments are also computed. Additionally, from the input data, a tape is prepared by the CDC 6500 computer for drawing sabot cross sections on the CALCOMP 570 Digital Plotter, together with a NANCY Digital Pringer Plot. The program is intended as another tool in the Computer Aided Design - Engineer (CAD-E) armory.

19G. Rockets

N75-22976/5GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

Parametric Studies with an Atmospheric Diffusion Model That Assesses Toxic Fuel Hazards Due to the Ground Clouds Generated by Rocket Launches.
R. B. Stewart, and W. L. Grose. May 75, 65p
NASA-TN-D-7852, L-9694

Descriptors: *Atmospheric diffusion, *Atmospheric models, *Rocket exhaust, *Rocket launching, *Toxic hazards, Afterburning, Carbon monoxide, Diffusion coefficient, Diffusion theory, Ground effect.

For abstract, see STAR 1314

20. PHYSICS

20A. Acoustics

AD-A011 123/7GA PC$3.75/MF$2.25
Naval Research Lab Washington D C
Effects of a Fluctuating Temperature Field on the Spatial Coherence of Acoustic Signals.
Interim rept.,
M. J. Beran, J. M. McCoy, and B. B. Adams. 22 May 75, 49p Rept no. NRL-7809

Descriptors: *Underwater sound, *Acoustic attenuation, Acoustic velocity, Temperature, Internal waves, Signal processing, Statistical analysis, Bessel functions, Numerical integration, Power spectra.

A Theoretical model has been developed for predicting the loss of spatial coherence of moderately low frequency acoustic signals (50 to 300 Hz) that results from the presence of a fluctuating temperature field caused by internal waves and by ocean turbulence. The model has been used to estimate limitations on the maximum useful length of a horizontal, linear, phased array the performance of which is degraded by the presence of the fluctuating temperature field.

AD-A011 138/5GA PC$4.25/MF$2.25
Mississippi Univ University Dept of Physics
Sound Absorption and Energy Transfer in Gases.
Final rept.,
F. Douglas Shields. 15 Sep 74, 58p
Contract N00014-70-A-0069

Descriptors: *Gases, *Acoustic absorption, *Acoustic velocity, Experimental design, Temperature, Molecular vibration, Relaxation, Scientific research, Surface properties, Oxygen, Water vapor.
Identifiers: Molecular relaxation, Gas surface interactions.

A summary is given of work done by the author in seventeen years of contract support by O.N.R. The work of the past year is summarized in two mixtures at 400 and 500K. The second reports the acoustical measurement of thermal and tangential-momentum accommodation coefficients.

AD-A011 206/0GA PC$3.25/MF$2.25
Lamont-Doherty Geological Observatory Palisades N Y
Tidal Wind Control of Long-Range Rocket Infrasound,
William L. Donn, Nambath K. Balachandran, and David Ring. 21 Oct 74, 4p ARO-12758.1-GS
Grant DAHC04-74-G-0240
Availability: Pub. in Jnl. of Geophysical Research, v80 n12 p1662-1664, 20 Apr 75.

Descriptors: *Infrasonics, *Sound transmission, *Rocket launching, Florida, Stratosphere, Rocket engines, Acoustic recording systems, New York, Wind, Atmospheric tides, Summer, Winter, Seasonal variations, Power spectra, Diurnal variations, Reprints.
Identifiers: Tidal wind, Sound channels.

Several times during the summer season, infrasound from rockets launched in the early morning at Cape Kennedy in Florida was recorded at Palisades, New York (1505 km to the NNE), beginning 85 min after launch. No other equivalent signals were recorded from summer rocket launchings later in the day, although strong signals are recorded from rockets launched at any time in winter. The strong winter effect is caused by the presence of strong stratospheric westerlies, which provide a good sound channel between the stations. This sound channel disappears in summer, when the stratospheric winds are easterly. The few good summer signals are explained by reflection above 100 km because tidal winds at that level in the early morning cause a favorable sound channel between source and receiver. The lower-frequency content of summer signals, compared with that of winter signals, is shown to result from attenuation of higher frequencies above 50 km. (Author)

AD-A011 321/7GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
On the Performance and Limitations of the Surface-Wave Resonator Using Grooved Reflectors.
Journal article,
Robert C. M. Li, Richard C. Williamson, Donald C. Flanders, and John A. Alusow. 1974, 7p Rept no. MS-3883 ESD-TR-75-153
Contract F19628-73-C-0002
Availability: Pub. in Proceedings IEEE 1974 Ultrasonics Symposium, p257-262.

Descriptors: *Surface waves, *Resonators, Diffraction, Reflectors, Grooving, Transmission loss, Propagation, Ultrahigh frequency, Substrates, Rayleigh waves, Reprints.
Identifiers: *Surface wave gratings, High q.

A simple, compact UHF surface-wave resonator with high Q has recently been reported. The resonator consists of a freely propagating Rayleigh wave multiply reflected between two periodic gratings of metallic (field-shorting) stripes or, alternatively, of mass-loading stripes on the crystal surface. The present paper is concerned with a resonator in which the reflectors consist of periodic gratings of etched grooves in the substrate surface. The limitations on this type of resonator as a result of diffraction, propagation loss, reflection loss (at imperfectly reflecting gratings), bulk-wave conversion, grating dispersion and groove width-to-space ratio are explored. Accurate design of grooved resonators is possible with the use of a theoretical model which yields results in good agreement with experiment. (Author)

AD-A011 322/5GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Problems Encountered in High-Frequency Surface-Wave Devices.
Journal article,
Richard C. Williamson . 1974, 9p Rept no. MS-3891 ESD-TR-75-155
Contract F19628-73-C-0002
Availability: Pub. in Ultrasonics Symposium Proceedings, p321-328 1974.

Descriptors: *Surface waves, *Transmission loss, Substrates, High frequency, Dispersions, Electron beams, Propagation, Lithium compounds, Niobates, Errors, Reprints.
Identifiers: Surface acoustic waves.

Propagation loss and pattern resolution are well recognized as serious impediments to the realization of practical surface-wave devices at frequencies greater than 1 GHz. In addition, a number of lesser-known problems become critical. Both propagation loss and dispersion are strongly affected by the character of the

substrate surface. Damage layers on LiNbO3 with a thickness of only a few tens of angstroms cause velocity dispersion of the order of 0.001 at 1 GHz. This dispersion introduces troublesome phase errors in surface-wave devices. Phase errors also result from the limited accuracy of electron-beam and interferometer-controlled pattern generators. Dynamic range is restricted by the occurrence of acoustic non-linearities at relatively modest input powers. The magnitude of these effects can be estimated and, in many cases, special techniques are available for alleviating these problems and achieving successful high-frequency devices. (Author)

AD-A011 323/3GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
16-Channel Surface-Acoustic-Wave Filter Bank.
Journal article,
Victor Dolat, and John Melngailis. 1974, 5p Rept no. MS-3894 ESD-TR-75-156
Contract F19628-73-C-0002
Availability: Pub. in Ultrasonics Symposium Proceedings, p756-759 1974.

Descriptors: *Surface waves, *Acoustic filters, *Acoustic waves, Propagation, Transducers, Reflectivity, Substrates, Insertion loss, Arrays, Lithium compounds, Niobates, Channels, Ion beams, Reprints.
Identifiers: Surface acoustic waves.

A 16-channel surface-acoustic-wave filter bank has been fabricated on a single 8.7 sq cm y-cut LiNbO3 substrate using reflection gratings as filtering elements. The bi-directional z-directed acoustic signal propagates through a sequence of ion-beam etched gratings each with a different period. Each grating resonantly reflects at 90 deg a narrow frequency band to an x-directed output transducer. This configuration yields an efficient filter bank in which the minimum unmatched insertion loss to any one channel is -30 dB, + or - 1/2 dB, and in which spurious signals due to triple transit and bulk waves are reduced below -80 dB with respect to the input. Each grating is depth weighted according to a Hamming function for sidelobe suppression to -37 dB below the peak signal in each pass channel. Each channel has a 6 dB passband of 2 MHz. The channels are 2 MHz apart and range from 200-230 MHz. Reactive energy storage within gratings introduce deviations from ideal filter performance. A method which compensates for these effects is described. (Author)

AD-A011 325/8GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Surface Acoustoelectric Correlator with Surface State Memory.
Journal article,
John H. Cafarella, Abraham Bers, and Ernest Stern. 1974, 4p Rept no. MS-3822 ESD-TR-75-152
Contract F19628-73-C-0002
Availability: Pub. in IEEE Ultrasonic Symposium Proceedings, p216-219 1974.

Descriptors: *Surface waves, *Memory devices, *Correlators, Acoustic waves, Silicon, Acoustic signals, Data storage systems, Lithium compounds, Niobates, Reprints.
Identifiers: Memory correlators, *Surface state memories, *Surface acoustoelectric correlators, Time constant, Time bandwidth product.

The results are presented from an experimental memory-correlator. Surface state charge storage is incorporated in a coupled LiNbO3-Si system to yield a device which stores a spatial replica of a reference acoustic signal and gives the correlation function of other acoustic signals with the reference. The time constant for storing a pattern in charged surface states is made much smaller than the thermal decay time constant associated with the traps. This effect allows wide bandwidth signals to be stored for long times. The present device uses Si on Y-Z LiNbO3 at 166 MHz. A short r.f. strobe is applied to the silicon plate to effect the storage of the acoustic wave pattern in surface states. The correlation loss is 47 dB for a 4.4 microsec cw signal. The strobe duration of 0.4 microsec corresponds to a 2.5 MHz bandwidth capacity, and a time-bandwidth product greater than 10 has been demonstrated. (Author)

AD-A011 326/6GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Surface Wave Correlator - Convolver with Memory.
Journal article,
Abraham Bers, and John H. Cafarella. 1974, 10p Rept no. MS-3890 ESD-TR-75-154
Contract F19628-73-C-0002
Availability: Pub. in IEEE Ultrasonic Symposium Proceedings, p778-787 1974.

Descriptors: *Surface waves, *Acoustic waves, *Memory devices, Correlators, Semiconductors, Dynamics, Reprints.
Identifiers: *Memory convolvers, *Memory correlators, Surface acoustic waves.

The principles of operation and application of surface acoustic wave (SAW) correlators and convolvers which contain a memory for signals are described. A detailed analysis is presented for the dynamics of surface states on a semiconductor as a memory in a SAW correlator-convolver.

AD-A011 388/6GA PC$3.25/MF$2.25
California Univ Los Angeles Dept of Engineering Systems
Suboptimal Estimation of Systems with Large Parameter Uncertainties (Estimation Suboptimale de Systems avec Incertitudes de Grands Parametres) (Suboptimale Schaetzung von Systemen mit Grossen Parameterunsicherheiten),
Cornelius T. Leondes, and Jack O. Pearson. 15 Jan 73, 13p AFOSR-TR-75-0860
Grant AF-AFOSR-2166-72
Summary in French, German and Russian.
Availability: Pub. Automatica, v10 p413-424 1974.

Descriptors: *Uncertainty, *Linear systems, *Kalman filtering, *Parametric analysis, *Noise, Parameters, Estimates, Acoustic filters, Vector analysis, Errors, Covariance, Matrices(Mathematics), Adaptive systems, Trade off analyses, Optimization, Open loop systems, Reprints.
Identifiers: Kalman-Bucy filters.

The design of a filter that must estimate the state of a system when large parameter uncertainties in the plant dynamics or plant and measurement noise covariance matrices are present is considered. Filter designs are evaluated relative to the trade off between filter sensitivity to the uncertain parameters and minimum mean-square estimation error. This is accomplished by reformulating the estimation problem as an optimization problem with vector-valued performance index. The dominant design has form similar to the Kalman-Bucy filter, and employ open-loop compensation for the uncertain parameters. (Author)

AD-A011 392/8GA PC$3.25/MF$2.25
Scripps Institution of Oceanography San Diego Calif Marine Physical Lab
Infrasonic Reception in Shallow Water: I.
Summary rept.,
Leonard Liebermann. 1 May 75, 10p Rept nos. SIO-Ref-75-11, MPL-U-86/74
Contract N00014-69-A-0200-6002

Descriptors: *Underwater sound, *Infrasonics, *Shallow water, Hydrophones, Acoustic attenuation, Reception.

Pressure and displacement hydrophones were used for reception of underwater signals in the frequency range, 1 to 30 Hz. Both hydrophone types were suspended below the surface on specially mounted cables intended to minimize vertical motion. In spite of careful suspension isolation, vertical cable motion dominated over the signal in the displacement sensor but not in the pressure sensor. The latter sensor was used to obtain data on background noise in the above frequency range.

AD-A011 554/3GA PC$3.25/MF$2.25
Saclant ASW Research Centre La Spezia (Italy)
Frequency-Dependent Influence of the Sea Bottom on the Near-Surface Sound Field in Shallow Water,
Edward Murphy, Alexander Wasiljeff, and Finn Jensen. 1 May 75, 24p Rept no. SACLANTCEN-SM-66
NATO furnished.

Descriptors: *Underwater sound, *Shallow water, Ocean bottom, Acoustic attenuation, Broadband, Transmission loss, Acoustic fields, Spectrum analysis, Mediterranean Sea.

The influence of the sea bottom on shallow-water sound propagation can be especially pronounced for the sound field near the boundaries. Comparison of the near-surface sound field with the mid-depth field, for example, can serve as a useful diagnostic tool for understanding the frequency-dependent influence of the sea bottom on sound propagation in shallow water. Broadband shallow-water sound-propagation data analysed in one-third octave bands are compared for a very shallow receiver (2 m) and a mid-depth receiver (50 m). The data are also compared with results from modal calculations. The interplay between the behaviour of the modal depth functions and modal attenuations, as frequency is varied, provides a convenient model for interpreting the results.

AD-A011 560/0GA PC$4.25/MF$2.25
Saclant ASW Research Centre La Spezia (Italy)
Spatial Horizontal Coherence of Acoustical Signals in Shallow Water,
Alexander Wasiljeff. 15 May 75, 29p Rept no. SACLANTCEN-SM68
NATO furnished.

Descriptors: *Underwater sound, *Shallow water, Hydrophones, Correlation techniques, Power spectra, North sea, Acoustic scattering, Narrowband, Mediterranean Sea.
Identifiers: Elba Island.

The cross-correlation function of a acoustic signal between various pairs of hydrophones on a horizontal array gives an estimate for the spatial coherence function. The width of this function is defined as coherence length. Its reciprocal value is a measure of the angular uncertainty of the array caused by the transmitting medium and its boundaries. The relationship between this value and the angular scattering function and its implication on array performance is discussed. Experiments have been performed in two shallow-water areas north and southeast of the island of Elba in both summer and winter conditions, using broadband acoustic sources of 180 g TNT explosive launched at different ranges. The broadband data were analyzed for different frequency bands to obtain the angular uncertainty as a function of range. During summer a higher angular uncertainty was found than under isothermal winter conditions but it was still less than one degree for ranges between 200 m and 20 km. The results are compared with data reported in the literature for the great Fisher Bank in the North Sea and for the Gulf of Lions.

ESDU/N Write for prices
Engineering Sciences Data Unit Ltd., London (England).
Aeronautical Series. Aerodynamics Sub-Series. Volume 1. Noise.
Collection of data items.
1 Apr 75, 6 data items in 1 binder
For information on availability of series, sub-series, or individual data items, write NTIS, Attn: ESDU, Springfield, Va. 22161.

Descriptors: *Jet aircraft, *Gas turbines, *Jet engine noise, Noise(Sound), Nozzle flow, Attenuation, Far field, Acoustic insulation, Acoustic impedence, User needs, Graphic methods, Great Britain.
Identifiers: ESDU/N, *Exhaust noise, *Shock noise, *Design engineering, *Engineering design data.

The data items analyse the sources of jet engine noise and investigate the effectivenss of acoustic liners.

N75-22278/6GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Effect of Entry-Lip Design on Aerodynamics and Acoustics of High Throat Mach Number Inlets for the Quiet, Clean, Short-Haul Experimental Engine.
B. A. Miller, B. J. Dastoli, and H. L. Wesoky. May 75, 45p NASA-TM-X-3222, E-8160

Descriptors: *Engine inlets, *Engine noise, *Noise reduction, *Short takeoff aircraft, Engine design, Graphs (Charts), Nacelles, Wind tunnel tests.

For abstract, see STAR 1314

N75-22318/0GA PC$5.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A Model and Plan for a Longitudinal Study of Community Response to Aircraft Noise.
W. J. Gunn, H. P. Patterson, J. Cornog, P. Klaus, and W. K. Connor. Apr 75, 104p NASA-TM-X-72690

Descriptors: *Aircraft noise, *Airport planning, *Human reactions, *Noise pollution, Acoustic measurements, Human factors engineering, Mathematical models, Stress analysis, Surveys.

For abstract, see STAR 1314

N75-22941/9GA PC$7.00/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Noise Data from Tests of a 1.83 Meter (6-Ft-) Diameter Variable-Pitch 1.2-Pressure-Ratio Fan (Qf-9).
F. W. Glaser, J. A. Wazyniak, and R. Friedman. Mar 75, 185p NASA-TM-X-3187, E-8102

Descriptors: *Noise reduction, *Short takeoff aircraft, *Turbofans, Jet aircraft noise, Noise measurement, Rotor aerodynamics, Rotor blades (Turbomachinery), Tables (Data).

For abstract, see STAR 1314

N75-23246/2GA PC$7.00/MF$2.25
Pennsylvania State Univ., University Park.
Propagation of Sound at Moderate and High Intensities in Absorbent and Hard Walled Cylindrical Ducts.
Ph.D. Thesis.
O. H. Mcdaniel. Mar 75, 177p NASA-CR-132650
Contract NGL-39-009-121
Subm-Sponsored in Part by NSF and Naval Ordnance Systems Command.

Descriptors: *Acoustic ducts, *Cylindrical bodies, *Sound propagation, Acoustic attenuation, Intensity, Linear arrays, Plane waves, Wave equations.

For abstract, see STAR 1314

N75-23247/0GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Spinning Mode Sound Propagation in Ducts with Acoustic Treatment.
E. J. Rice. May 75, 32p NASA-TN-D-7913, E-8140

Descriptors: *Acoustic ducts, *Noise reduction, *Propagation modes, *Sound propagation, Acoustic attenuation, Bessel functions, Mach number, Mathematical models, Nose inlets, Suppressors.

For abstract, see STAR 1314

N75-23249/6GA PC$3.25/MF$2.25
Tokyo Univ. (Japan).
Detection of Echo by Linear Prediction.
H. Kobatake. Jan 75, 14p ISAS-522-VOL-40-NO-2
Rean-Repr. From Inst. Of Space and Aeron. Sci., Univ. Of Tokyo Rept. No. 522, Jan. 1975 p 29-38.

Descriptors: *Echoes, *Linear prediction, *Signal detection, Bandwidth, Delay, Delta function, Sound propagation, Sound waves, Time series analysis.

For abstract, see STAR 1314

20B. Crystallography

AD-A011 167/4GA PC$3.25/MF$2.25
California Univ Irvine Dept of Physics
Theory of Temperature-Dependent Surface Force Constant Changes in Body-Centered Cubic Crystals.
Interim rept.,
D. J. Cheng, R. F. Wallis, and L. Dobrzynski. 22 Nov 74, 15p Rept no. TR-74-10
Contract N00014-69-A-0200-9003

Descriptors: *Surface properties, Iron, Crystal lattices.
Identifiers: Lennard-Jones potential, *Force constants, Lattice vibrations, Body centered cubic lattices.

A theoretical calculation has been made of the temperature dependence of the force-constant changes at the (001) free surface of body-centered cubic crystals. The changes arise from anharmonic effects. The procedure consists of first calculating the dynamical displacements by evaluating the Helmholtz free energy including anharmonic terms with the aid of many-body theoretical techniques and then calculating the change in force constants in the vicinity of a crystal surface produced by the cubic anharmonic terms in the crystal potential energy. Numerical estimates of the force-constant changes have been made for alpha-iron using a model consisting of Lennard-Jones 6-12 type central interactions up to second neighbors. The influence of surface force-constant changes on such effects as the surface-mode frequencies, the temperature dependent surface mean-square displacements and the stability of a crystal surface are discussed.

AD-A011 197/1GA PC$3.75/MF$2.25
Michigan Technological Univ Houghton Dept of Metallurgical Engineering
Observations on Interphase Boundary Structure,
H. I. Aaronson. 28 Aug 74, 28p ARO-11264.5-MC
Grant DA-ARO-D-31-124-73-G144
Availability: Pub. in Jnl. of Microscopy, v102 pt3 p275-300 Dec 74.

Descriptors: *Grain boundaries, *Grain growth, Dislocations, Precipitation, Eutectics, Grain structures(Metallurgy), Reviews, Reprints.

AD-A011 252/4GA PC$3.75/MF$2.25
Harry Diamond Labs Adelphi Md
Rare Earth Ion-Host Crystal Interactions. 2. Local Distortion and Other Effects in Reconciling Lattice Sums and Phenomenological B sub km.
Technical rept.,
Nick Karayianis, and Clyde A. Morrison. Jan 75, 36p Rept no. HDL-TR-1682
See also report dated Oct 73, AD-776 330.

Descriptors: *Crystal structure, Neodymium, Erbium, Hartree-Fock approximation, Tungstates.
Identifiers: *Calcium tungstates, Lattice parameters, Crystal fields.

The effect of Nd and Er on the lattice parameters of CaWO4 was studied. The Hartree-Fock approximations of rare earth elements in CaWO4 are presented and crystal field parameters are derived.

AD-A011 283/9GA PC$5.75/MF$2.25
Stanford Univ Calif Stanford Electronics Labs
Crystal Growth and Magnetic Anisotrophy of Copper Ferrite (CuFe2O4).
Technical rept.,
Dean A. Herman, Jr. Feb 75, 126p Rept nos. SU-SEL-75-002, TR-5304-2
Contract DAHC04-72-C-0014
Sponsored in part by National Science Foundation, Washington, D.C. and Advanced Research Projects Agency, Arlington, Va.

Descriptors: *Ferrites, *Crystal growth, Magnetic properties, Crystal structure, Spinel, Copper compounds, Ferromagnetism, Magnetic resonance, Anisotropy, Phase transformations, Atomic energy levels, Theses.
Identifiers: *Copper ferrites, Magnetic anisotropy.

This report examines some of the basic crystalline properties of single crystal copper ferrite. Crystal growth of single crystal copper ferrite at Stanford and by other investigators is reviewed. Ferromagnetic resonance experiments on crystals grown at low temperatures gave evidence of magnetic anisotropy (with tetragonal symmetry).

AD-A011 464/5GA PC$3.25/MF$2.25
Army Materials and Mechanics Research Center Watertown Mass
Crystal Growth using the Heat Exchanger Method (HEM),
Dennis J. Viechnicki, and Frederick Schmid. 26 Dec 73, 6p Rept no. AMMRC-MS-75-2
Availability: Pub. in Jnl. of Crystal Growth, v26 p162-164 1974.

Descriptors: *Crystal growth, *Heat exchangers, *Sapphire, *Spinel, Liquids, Solids, Interfaces, Optimization, Processing, Reprints.
Identifiers: HEM(Heat exchanger method), *Heat exchanger method.

The progress of the liquid-solid interface during crystal growth of sapphire and spinel using the heat exchanger method (HEM) has been studied and related to processing parameters. Crystal growth has thus been optimized to produce crystals with 95-100% of the material free of voids and scattering centers. (Author)

AD-A011 480/1GA PC$3.25/MF$2.25
IBM Thomas J Watson Research Center Yorktown Heights N Y

Computer-Controlled Molecular Beam Epitaxy,
Leo Esaki. 1974, 9p ARO-11574.18-P
Contract DAHC04-74-C-0012
Presented at Proceedings of the International Vacuum Congress (6th), 25-29 Mar 74, Kyoto (Japan).
Availability: Pub. in Japanese Jnl. of Applied Physics, Supplement 2, Part 1, p821-828 1974.

Descriptors: *Epitaxial growth, *Molecular beams, *Ultrahigh vacuum, Computer applications, Arsenic alloys, Gallium alloys, Aluminum alloys, Semiconductors, Sputtering, Ions, Reprints.

A versatile, computer-controlled MBE system has been developed for preparation of superfine multilayer structures consisting of GaAs, AlAs and their alloys. The capabilities of a high degree of precise control have been designed to achieve high-resolution structures which enable us to observe quantum-mechanical effects arising from the interaction of electron waves with tunneling barriers in high-quality monocrystalline semiconductors. In ultrahigh vacuum, a mass spectrometer, monitoring multiple beam intensities, provides input data for a process control computer which commands the entire operation. HEED and Auger analyzers examine the surface in situ during growth and a combination of Auger electron spectroscopy and ion sputter-etching makes it possible to profile the composition in the grown structures. The recent experimental results of anomalous transport properties in our grown structures, such as double tunnel barriers and superlattices, which clearly manifest the predicted effects is also reported.

AD-A011 518/8GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Physics
Motion of Two Screw Dislocations in a Lattice,
N. Flytzanis, V. Celli, and A. Nobile. 23 Jul 74, 8p AFOSR-TR-75-0730
Grant AF-AFOSR-1973-71
Availability: Pub. in Jnl. of Applied Physics, v45 n12 p5176-5181 Dec 74.

Descriptors: *Crystal lattices, *Materials, *Crystal structure, *Sound waves, Dislocations, Strength(Mechanics), Stresses, Parallel orientation, Equations of motion, Damping, Strain(Mechanics), Rupture, Atoms, Displacement, Graphics, Supersonic flow, Mathematical models, Reprints.
Identifiers: *Piecewise linear analysis, *Screw dislocations(Crystal lattices), *Dislocation theory.

In a simple model of a cubic lattice with piecewise linear and nearest-neighbor interactions a solution is obtained for the motion of two parallel screw dislocations of the same sign, under the action of a constant applied stress. The only damping mechanism considered is the emission of sound waves. The important parameters are the external strain s and the dislocation separation alpha They are determined by energy balance and the boundary conditions imposed by the force law. The main result is the existence of multiple branches in the strain versus velocity curve, the lowest of which corresponds to an external strain less than that of a single dislocation. However, in the snapping bond model, two dislocations, as well as a single dislocation, cannot move at supersonic velocities without causing a breakdown of the crystal. (Author)

AD-A011 523/8GA PC$3.25/MF$2.25
California Univ Irvine Dept of Physics
Effect of Spin Ordering on the Magnetic Contribution to the Kapitza Conductance between Two Spin Systems,
D. Mills, and M. Beal-Monod. 24 Jun 74, 10p AFOSR-TR-75-0738
Grant AF-AFOSR-2018-71
Availability: Pub. in Physical Review A, v10 n6 p2473-2481 Dec 74.

Descriptors: *Crystal lattices, *Nuclear spins, *Liquid helium, Crystal structure, Magnetic fields, Impurities, Interactions, Temperature, Alloys, Reprints.
Identifiers: CMN(Cerium magnesium nitrate), Cerium magnesium nitrate.

A theoretical discussion of the temperature and magnetic-field dependence of the contribution to the thermal boundary conductance (Kapitza conductance) from the interaction between liquid-He(3) nuclear spins and electron spins in a magnetic solid is presented for the case T lies below the ordering temperature T sub O of the solid. Our calculations apply to the temperature range 3 less than or equal to T less than or equal to 100 mK, where the He(3) may be regarded as a normal Fermi fluid. We consider three cases: (1)a dilute alloy with magnetic impurities which experience random internal fields, (2)an array of ferromagnetically aligned spins arranged on a crystal lattice, and (3)a ferromagnetically aligned, but spatially disordered, array of spins. We also examined the presently available data on the magnetic contribution to R sub K in the light of the theoretical results.

AD-A011 611/1GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
An Atlas of Laue Patterns for SiC Polytypes.
Interim rept.,
H. Posen. 1973, 11p Rept no. AFCRL-TR-75-0314
Pub. in Proceedings of Silicon Carbide, 1973.

Descriptors: *Silicon carbides, *Crystal structure, X ray diffraction, Orientation(Direction).
Identifiers: Powder patterns, *Laue method.

Simulated back reflection and transmission x-ray laue patterns have been generated on a digital computer of beta-SiC and alpha-SiC polytypes 2H, 4H, 6H, and 15R. For each polytype, the Laue patterns corresponding to the (100), (001), (111) and (210) crystal orientations are generated as well as the corresponding stereogram. The Laue Patterns are based on a specimen to film distance of 3.0cm, and each Laue spot is scaled in proportion to the relative intensity of the particular reflection and the number of superimposed reflection orders. Only those (hkl) values consitent with the space group vanishings of the particular polytype are plotted. The simulated Laue patterns are presented in indexed and unindexed plots to enhance pattern symmetry recognition. The use of these patterns for the rapid identification of polytype is demonstrated.

AD-A011 612/9GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Observations of Slip Distributions in Alpha SiC Crystals.
Scientific interim,
H. Posen, and J. Bruce. 1973, 11p Rept no. AFCRL-TR-75-0315
Pub. in Proceedings of Silicon Carbide, 1973.

Descriptors: *Silicon carbides, *Defects(Materials), Single crystals, Doping, X ray diffraction, Semiconductors, Dislocations.
Identifiers: *Slip(Crystallography).

The growth of large single crystals of silicon carbide has been the objective of many laboratories throughout the world. However, semiconductor device applications are less dependent on size than on defect distributions, and understanding when such defects occurr in the growth process may be important in the obtention of defect free silicon carbide. In this paper the authors report on slip distributions in three alpha-SiC crystals of the same polytype but of different national origin and of different dopant. The primary investigative tool was x-ray topography with ancillary optical evaluations.

AD-A011 630/1GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Mechanical Engineering
Violation of Thermal Equilibrium in a Thermomigration Experiment,
R. A. McKee, and J. P. Stark. 5 Sep 74, 10p
AFOSR-TR-75-0768
Grant AF-AFOSR-2343-72
Availability: Pub. in Physical Review B, v11 n4 p1374-1381 Feb 75.

Descriptors: *Migration, *Equilibrium(General), *Crystals, Thermal properties, Errors, Predictions, Transport properties, Thermodynamics, Crystal defects, Reprints.
Identifiers: Thermal equilbrium, Thermomigration, Vacancies.

The applicability of thermal equilibrium as a criterion for the prediction of the distribution of vacant atomic sites in a nonisothermal crystal has been tested and found to be in error.

COM-75-50356/5GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Neutron Quasielastic Scattering Study of the Ammonium Ion Reorientations in a Single Crystal of NH4Br at 373K.
Final rept.,
R. C. Livingston, J. M. Rowe, and J. J. Rush. 1 Jun 74, 6p
Pub. in Jnl. of Chemical Physics, v60 n11 p4541-4546, 1 Jun 74.

Descriptors: *Neutron scattering, *Crystal structure, Single crystals, Ammonium compounds, Orientation, Molecules.
Identifiers: *Ammonium bromide, Reprints.

The ammonium ion reorientations in a single crystal of NH4Br in its disordered CsCl phase have been investigated by quasielastic neutron scattering at 373K. Neutron spectra were measured at four different crystal orientations (with the 110 planes of the crystal in the scattering plane) and data were recorded simultaneously at a variety of scattering angles providing a range of momentum transfers for elastic scattering. The experimental results were fit to models allowing instantaneous random jumps around the C2 and C3 axes of the (NH4) (+) ions using a variety of analytical procedures that are described in some detail. The inelastic part of the measured neutron spectra shows a torsional vibration peak at 305/cm, in good agreement with previous values. The results and analysis demonstrate the value of single crystal measurements in neutron studies of dynamic orientational disorder in solids.

PAT-APPL-563 008/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Method for Growing Crystals.
Patent Application,
Cortland O. Bugger. Filed 27 Mar 75, 16p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Crystal growth, Patents, Fused salts, Solvents, Calcium compounds, Aluminum compounds, Single crystals, Nitrides.
Identifiers: *Patent applications, *Aluminum nitrides, PAT-CL-423-412.

The patent application discloses a method for growing single crystals which uses calcium nitride as a solvent system in the molten solution growth of bulk aluminum nitride crystals.

20C. Electricity and Magnetism

AD-A011 203/7GA PC$3.25/MF$2.25
Princeton Univ N J Dept of Electrical Engineering
Unipolar Current Transport through Metal-Insulator-Metal (MIM) Structures, Supplied with Barrier Contacts, in the Diffusion Limit,
Gerardo Cisneros, and Peter Mark. 14 Aug 74, 7p ARO-12606.1-P-A
Grant DAHC04-74-G-0193
Availability: Pub. in Solid-State Electronics, v18 p563-568 1975.

Descriptors: *Electric current, *Electrical insulation, Diffusion, Transport properties, Voltage, Barriers, Electrical resistance, Reprints.

The diffusion-limited unipolar current density-voltage (j-V) dependencies through semi-insulating materials supplied with two barrier contacts have been computed. Two cases are treated. In the first, the sum of the two quiescent barrier thicknesses is less than the specimen thickness. In the second case, the sum of the two quiescent barrier thicknesses exceeds the specimen thickness.

AD-A011 391/0GA PC$3.25/MF$2.25
General Electric Corporate Research and Development Schenectady N Y
Properties of Microsamples of Sintered Cobalt-Samarium Magnets.
Interim technical rept.,
J. J. Becker. Jun 75, 10p Rept no. SRD-75-055
Contract N00014-74-C-0271

Descriptors: *Permanent magnets, Cobalt alloys, Samarium, Sintering, Magnetic properties, Grain size, Microstructure, Hysteresis.
Identifiers: *Cobalt intermetallics, *Samarium intermetallics.

Hysteresis loops of small but still multigrain samples taken from sintered Co5 Sm magnets show a wide range of behavior, samples from the same magnet bracketing the bulk properties. Magnetization discontinuities often appear and are associated with large grains. These jumps show a quantized dependence of jump field on magnetizing field as in particles prepared from cast material. A sample consisting of only one grain gave a completely rectangular loop. Measurements on sintered magnets indicate that large grains tend to reverse in small fields, detracting from the overall properties.

AD-A011 632/7GA PC$3.25/MF$2.25
Purdue Univ Lafayette Ind Thermophysical Properties Research Center
Apparatus for Electrical Resistivity Measurements on Flash Diffusivity Samples,
R. E. Taylor, and H. Groot. 20 Feb 74, 5p
AFOSR-TR-75-0633
Grant AF-AFOSR-2375-72
Availability: Pub. in Jnl. High Temperatures - High Pressures, v6 p123-126 1974.

Descriptors: *Electrical resistivity, Test equipment, Thermal diffusion, Stainless steel, Iron, Graphite, Reprints.
Identifiers: Flash diffusivity.

A modified four-probe method has been developed which is suitable for measuring the electrical resistivity of thin round disk-shaped samples, such as are used for thermal diffusivity measurements by the widely-used flash method. The technique is shown to be applicable from 100 to 700K on a variety of materials including metals, alloys, and graphites. (Author)

AD-A011 641/8GA PC$3.75/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Basic Mathematical Investigations in Electromagnetic Wave Theory.
Final rept. 1 Jan 64-31 Dec 68,
Joseph B. Keller. Jan 69, 49p AFCRL-69-0109
Contract AF-19(628)-3868

Descriptors: *Electromagnetic wave propagation, *Diffraction, Maxwells equations, Dispersion relations, Theorems, Surface waves.

This report is a summary of research activities pursued during the period from January 2, 1964 to January 1, 1969 by the Division of Electromagnetic Research of the Courant Institute of Mathematical Sciences at New York University, under the contract. The object of the research was to extend existing knowledge of classical electromagnetic theory with emphasis on electromagnetic wave-guiding radiation and communication, and diffraction problems. Topics discussed include the following: Diffraction theory; Surface waves; Problems involving thin domains; Propagation in random media; Miscellaneous.

N75-23239/7GA Not available NTIS
Comitato Nazionale per l'Energia Nucleare, Frascati (Italy). Lab. Nazionali di Frascati.
Calculation of the Force Exercised on an Aluminum Plate Moving Uniformly in a Traveling Magnetic Field Moving Sinusoidally in the Direction of Motion.
F. G. Moscati, G. Sacerdoti, and M. G. Veca. 6 May 74, 31p LNF-74/20(R)
Language in Italian.

Descriptors: *Magnetic suspension, *Motion stability, *Plates (Structural members), Loads (Forces), Magnetic fields, Numerical analysis.

For abstract, see STAR 1314

20D. Fluid Mechanics

AD-A011 125/2GA PC$3.25/MF$2.25
Naval Ship Research and Development Center Bethesda Md
Base Pressure Distribution of a 10 Degree Sharp Cone at Hypersonic Speeds and High Angles of Attack.
Final rept.,
George S. Pick. Apr 75, 18p Rept nos. NSRDC-4632, AERO-1201
Presented at the AIAA Thermosphysics Conference, (7th), San Antonio, Texas, April 72. AIAA Paper No. 72-316.

Descriptors: *Conical bodies, *Hypersonic characteristics, *Base pressure, Model tests, Angle of attack, Free flight models, Instrumentation, Sharp bodies, Reynolds number, Test methods, Data acquisition, Data processing, Pressure distribution, Slender bodies.
Identifiers: High angles of attack.

The basic objective of the current work was to obtain reliable, interference-free base pressure distribution data on a 10 deg half angle sharp cone at high angles of attack and at hypersonic speeds with varying Reynolds numbers. To this end, a free-flying instrumented model was developed and tested in a free jet hypersonic facility. It was designed to be injected into the flow field at predetermined angles of attack and roll and to be released with adequate vertical velocity to fly through the test section.

AD-A011 152/6GA PC$4.25/MF$2.25
Pennsylvania State Univ University Park Ordnance Research Lab
Sound Propagation in Wakes.
Technical memo.,
Walter F. King, III. 8 Sep 72, 62p Rept no. TM-72-198
Contract N00017-70-C-1407

Descriptors: *Ship hulls, *Wake, *Ocean environments, Surface navigation, Underwater navigation, Acoustic fields, Bubbles, Turbulence, Hydrodynamics, Sound transmission, Two dimensional flow, Mathematical models, Equations of motion, Problem solving, Refraction, Vortices, Paths.
Identifiers: Acoustic wake, Ray acoustics.

A theoretical investigation of sound propagation through the near regions of both surface and underwater wakes is presented in the limits of ray acoustics. The two-dimensional stochastic ray equation is used to obtain solutions for the raypaths and intensities in model wakes. Calculations based upon velocity profile approximations which include layers of constant velocity gradients, distributions of bubbles, turbulence, and other inhomogeneities are represented by continuous, two-dimensional, refractive index fields. Random inhomogeneities are included by stochastically varying the refractive field at intervals approximately equal to the scale of the energy containing eddies. Ray plots and intensity contours are presented for a number of field configurations representing single and twin screw wakes.

AD-A011 176/5GA PC$4.25/MF$2.25
Pennsylvania State Univ University Park Applied Research Lab
Effects of Chordwise Velocity Variations on the Time-Dependent Thrust Generated by a Propeller Operating in a Spatially Varying Velocity Field.
Technical memo.,
Donald E. Thompson. 8 Mar 73, 71p Rept no. TM-73-34
Contract N00017-70-C-1407

Descriptors: *Thrust, *Propellers(Marine), *Time dependence, Model tests, Water tunnels, Mathematical models, Theory, Propeller blades, Velocity, Nonuniform flow, Mathematical prediction, Variations, Test equipment.
Identifiers: *Velocity fields, Unsteady flow.

An experimental and theoretical investigation of the effects of chordwise velocity variations on the time-dependent thrust generated by a propeller operating in a spatially varying velocity field is described. It is shown that the effects of chordwise velocity variations can become substantial as the steady thrust on the propeller is increased.

AD-A011 254/0GA PC$4.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
The Structure of Three-Dimensional Separated Flows in Obstacle-Boundary Layer Interactions.
Final rept.,
Raymond Sedney, and Clarence W. Kitchens, Jr. Jun 75, 51p Rept no. BRL-1791

Descriptors: *Boundary layer flow, *Flow separation, *Turbulent boundary layer, Wind tunnel tests, Walls, Flow visualization, Supersonic characteristics, Barriers, Supersonic wind tunnels, Three dimensional flow, Vortices, Reynolds number.
Identifiers: Protuberances.

The subject is investigated with flow visualization techniques; the turbulent boundary layer on the wall of a continuous supersonic wind tunnel is used. Sizeable separated flow regions can be studied since the wall width is 38cm and the boundary layer is typically 2.5cm thick. The large scale of the experiment is required to resolve the fine details of the flow structure. The flow visualization techniques are discussed. The structure of the separated flow upstream of the obstacle is seen to change with relatively small changes in Reynolds number R; the number of vortices varies from 6 to 4 to 2 as R changes. Data are presented for large and

small protuberances, but the latter are emphasized.

AD-A011 271/4GA PC$3.75/MF$2.25
National Aeronautical Establishment Ottawa (Ontario)
The Spreading of a Liquid Drop on a Plane Solid (l'Etendue d'une Goutte Liquide sur une Surface Plate et Solide),
A. M. Drummond. Jan 75, 32p Rept no. NAE-LR-583 NRC-14579
Summary in French. Also pub. as ISSN-0077-0340.

Descriptors: *Fluid dynamics, *Drops, Liquids, Planar structure, Flow, Test methods, Sizes(Dimensions), Experimental data, Surface properties, Canada.
Identifiers: Spreading.

The need to measure the size of drops in a fluid spray has resulted in the invention of many techniques to catch a drop sample. Since the standard methods of spray sample collection were not satisfactory for the problem at hand. A method for catching spray droplets was devised whereby they were not absorbed or destroyed. The theoretical spread factor analysis was experimentally verified for drops less than about 450 micrometers. For larger drops, the spread factor was larger than that theoretically predicted which implies a smaller contact angle for larger drops. The test method and results are discussed.

AD-A011 284/7GA PC$3.75/MF$2.25
Cincinnati Univ Ohio Dept of Mechanical Engineering
Influence of Injection Angle on Film Cooling Effectiveness in Laminar Compressible Flow.
Technical rept.,
Y. G. Tsuei, and R. H. Nilson. May 75, 31p Rept no. 75-45 ARO-T-4.69-E
Contract DAHC04-69-C-0016

Descriptors: *Film cooling, *Laminar boundary layer, *Injection, Equations of motion, Numerical analysis, Flow, Slots, Walls, Angles, Compressible flow.
Identifiers: Variables.

Wall cooling effectiveness is investigated for tangential, inclined, and normal injection of coolant through single or multiple wall slots into a laminar compressible boundary layer. Numerical solutions of the boundary layer equations are obtained by a reliable finite difference method. A grid control procedure which maintains a constant flow rate between grid lines is applied to the injection calculations wherein the boundary layer growth in the slot is as much as hundred-fold and the longitudinal component of the injection velocity is in some cases as large as the free stream velocity. Film cooling effectiveness is reported for a variety of injection configurations so that the effects of injection angle, coolant mass flow rate, Mach number, upstream boundary layer thickness, slot width, and the presence of upstream cooling slots can be investigated.

AD-A011 386/0GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Mechanical Engineering
Double-Discharge Arrangement for CW Electrical Excitation of Supersonic Flows,
J. H. Blom, and R. K. Hanson. 29 Jul 74, 4p
AFOSR-TR-75-0753
Contract F44620-73-C-0045
Availability: Pub. in Jnl. of Applied Physics Letters, v26 n4 p190-192, 15 Feb 75.

Descriptors: *Supersonic flow, *Excitation, Continuous waves, Lasers, Nitrogen, Carbon monoxide, Electric discharges, Reprints.
Identifiers: Double discharge.

A simple double-discharge electrode arrangement for the CW excitation of supersonic molecular gas flows is described. Stable discharges in N2 and N2/CO mixtures, with E/N of 2.0-2.5 x 10 to the -16th power V sq cm and a power loading of 0.026 eV/molecule, were achieved. (Author)

AD-A011 421/5GA PC$4.75/MF$2.25
National Research Council of Canada Ottawa (Ontario) Div of Mechanical Engineering
Quarterly Bulletin of the Division of Mechanical Engineering and the National Aeronautical Establishment 1 January to 31 March 1975.
Mar 75, 84p Rept no. DME/NAE-1975(1)
Also pub. as ISSN-0047-9055

Descriptors: *Mechanical engineering, *Aeronautics, Human factors engineering, Control systems, Gas dynamics, Aerodynamics, Hydraulic equipment, Ships, Mechanics.

Complete articles on the following topics are given: A transmission line wave height and level transducer; Icing of fishing vessels in Canadian waters; Current projects of the Division of Mechanical engineering and the National Aeronautical Establishment in the following laboratories are summarized: analysis, control systems and human engineering, engine, flight research, fuels and lubricants, gas dynamics, high speed aerodynamics, hydraulics, instruments, low speed aerodynamics, low temperature, marine dynamics and ship, structures and materials, unsteady aerodynamics.

AD-A011 442/1GA PC$3.25/MF$2.25
Office of Naval Research London (England)
Some Pure and Applied Fluid Mechanics Research in France,
Roger E. A. Arndt. 5 May 75, 12p Rept no. ONRL-R-5-75

Descriptors: *Fluid mechanics, *Research facilities, France, Turbulence, Laboratories, Mixing, Turbomachinery, Scientific research, Technology, Mathematical models, Test facilities, Cavitation.
Identifiers: Consulting services, Aeroacoustics.

This report describes the activities of two research establishments in France: The Laboratoire de Mecanique des Fluides of the Ecole Centrale de Lyon and Techniques des Fluides, Grenoble. Visiting the two facilities on the same trip allowed good comparison between a basic research facility and an industrial consulting firm. The former institution has an international reputation for quality research in fluid mechanics and aeroacoustics. The latter is involved in activities ranging from contract research in cavitation to the design and construction of large testing facilities.

AD-A011 495/9GA PC$4.75/MF$2.25
Naval Ship Research and Development Center Bethesda Md
A Numerical Study of Viscous Flows of Stably Stratified Fluids over Barriers.
Final rept.,
Henry J. Haussling. Nov 74, 88p Rept no. NSRDC-4579

Descriptors: *Viscous flow, *Barriers, *Fluid dynamics, Stratification, Time dependence, Numerical methods and procedures, Stability, Mathematical models, Problem solving, Navier Stokes equations, Finite difference theory, Velocity.
Identifiers: Velocity profiles, Lee waves, Stratified flow.

Numerical techniques for integrating the Navier-Stokes equations, which have proven useful in the study of homogeneous viscous flows, have been extended to handle the flow of a stably stratified viscous fluid over an infinitely long ridge. The flow is considered to be time-dependent and arbitrary initial conditions are employed. Almost steady-state solutions have been computed for Re=10 with Ri=0, 0.25, 2, and 4; and Re=100 with Ri=0.25, where Re and Ri are the Reynolds and Richardson numbers, respectively. An almost periodic solution has been found for Re=100 with Ri=2. Two basic velocity profiles have been used to demonstrate the dependence of the flow characteristics on the basic flow.

AD-A011 584/0GA PC$5.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Intermittency, The Entrainment Problem.
Technical interim rept. Jun 71-Jun 73,
P. M. Bevilaqua. Mar 75, 104p Rept no. ARL-75-0095

Descriptors: *Wake, *Boundaries, *Turbulent flow, Laminar flow, Interfaces, Surfaces, Entrainment, Mathematical models, Vortices, Diffusion, Hypotheses, Spheres, Recirculation, Jets, Towed bodies, Water channel test facilities, Flow visualization, Mixing.
Identifiers: Intermittent flow.

The mechanism of entrainment in turbulent wake flows has been analytically and experimentally examined. It is argued that the development of the wake is dominated by the vortices shed from the recirculation region. These vortices cause the rapid diffusion of the mean flow and are responsible for the appearance of 'waves' on the turbulent interface. An explanation for the persistence of the vortices is found in terms of a strain energy stored in the anisotropy of the vortices on the mean flow is described by relating the size and strength of the vortices to an additional eddy viscosity.

AD-A011 591/5GA PC$7.00/MF$2.25
Martin Marietta Aerospace Denver Colo Denver Div
Mixing Investigation of Supersonic Hydrogen and Fluorine Flows.
Final rept. 3 May 73-3 Jul 74,
J. O. Bunting, P. C. Steel, and R. D. Bryant. May 75, 195p Rept no. MCR-74-359 AFWL-TR-74-223
Contract F29601-73-C-0088
See also report dated Jun 73, AD-766 754.

Descriptors: *Gas dynamics, *Supersonic characteristics, *Gas lasers, Hydrogen, Fluorine, Mixtures, Chemical lasers, Nozzle gas flow, Mixing, Shock tubes, Injection, Simulation, Mathematical models, Shear properties, Turbulent flow.
Identifiers: Mixing regions.

Experimental data from two shock tube/shock tunnel facilities capable of simulating the mixing zone regions of continuous-flow chemical laser devices are presented. One facility is specifically designed for reproducing the reaction mixing region developed when hydrogen is injected through sonic holes into a supersonic fluorine-carrying stream; the other simulates the parallel shear layer mixing developed between a supersonic fluorine-carrying stream and an adjacent supersonic hydrogen-carrying stream. A theoretical model of the turbulent chemically reactive mixing zone has been shown to provide remarkably good agreement with the experimental results for conditions where the mixing zones are turbulent.

AD-A011 605/3GA PC$4.75/MF$2.25
Advisory Group for Aerospace Research and Development Paris (France)
Vortex Wakes of Conventional Aircraft,
Coleman duP. Donaldson, and Alan J. Bilanin. May 75, 84p Rept no. AGARD-ograph-204
NATO furnished.

Descriptors: *Wake, *Aeronautics, Aircraft, Vortices, Reviews, Geometric forms, Turbulent flow, Atmospheric disturbances, NATO.

A review is made of the present state of our knowledge of the vortex wakes of conventional aircraft. Included are discussions of wake rollup, geometry, instability, and turbulent aging. In the light of these discussions, a brief review is made of the persistence of vortices in the atmosphere, and design techniques which might be used to minimize wake hazard are considered.

AD-A011 671/5GA PC$3.75/MF$2.25
California Univ Berkeley Dept of Mechanical Engineering
Finite Element Methods in Fluid Flow.
Interim rept.,
R. Temam. Feb 75, 32p Rept no. FM-75-2
AFOSR-TR-75-0801
Grant AF-AFOSR-2318-72

Descriptors: *Fluid mechanics, *Viscous flow, *Problem solving, Computations, Numerical methods and procedures, Finite element analysis, Incompressible flow, Equations of motion, Navier Stokes equations, Linear systems.

Computations of viscous incompressible flow by a finite element method are described. The method is described using the simple case of the solution of Poisson's equation. Then the technical problem of automatic triangulation of a domain is discussed. Application of the finite element method to the Navier-Stokes equations is presented with a discussion of some practical aspects of the implementation of the method.

COM-75-10710/2GA PC$3.25
McGill Univ., Montreal (Quebec). Dept. of Mathematics.
Instability of Rigidly Rotating Flows to Non-Axisymmetric Disturbances,
S. A. Maslowe. 17 Dec 73, 13p NOAA-75051213
Grant NOAA-N22-229-72(G)
Pub. in Jnl. of Fluid Mechanics, v64 pt2 p307-317 1974.

Descriptors: *Shear flow, *Hydrodynamics, Rotation, Stability, Axial flow, Numerical analysis, Mathematical models, Differential equations, Problem solving, Perturbation.
Identifiers: *Swirl flow, Instability.

An investigation of the hydrodynamic stability of swirling flows having arbitrary Rossby numbers is described. A necessary condition for instability is derived for rigidly rotating flows and this condition is further refined in the specific case of a parabolic axial flow. Numerical results are presented for two azimuthal wave numbers corresponding to the maximum growth rates for unstable perturbations as a function of Rossby number. Previous explanations of the instability mechanism are discussed.

N75-22274/5GA PC$3.25/MF$2.25
Martin Marietta Labs., Baltimore, Md.
Inviscid Flow About Blunted Cones of Large Opening Angle at Angle of Attack.
Final Report.
S. H. Maslen. Mar 75, 15p NASA-CR-132652, MML-TR-75-10C
Contract NAS1-12872

Descriptors: *Angle of attack, *Blunt bodies, *Inviscid flow, *Nose cones, Convergence, Laminar flow, Stagnation point, Transonic flow.

For abstract, see STAR 1314

N75-22277/8GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
Evaluation of a Hemispherical Head Flow Direction Sensor for Inlet Duct Measurements.
D. L. Bennett. May 75, 24p NASA-TM-X-3232, H-862

Descriptors: *Ducted flow, *Flow direction indicators, *Flow distribution, *Wind tunnel tests, Calibrating, Data acquisition, Equipment specifications, Recording instruments.

For abstract, see STAR 1314

N75-22288/5GA PC$3.75/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Divergent Nozzle Calculation for Supersonic Flow with Added Thermal Energy Calcul de Tuyeres Divergentes pour UN Ecoulement Supersonique Avec Apport d'Energie Thermique.
B. Gautier. 11 Jun 74, 37p ISL-23/74
Contract DRME-74/397
Language in French.

Descriptors: *Divergent nozzles, *Nozzle design, *Supersonic flow, *Thermal energy, Boundary layers, Energy distribution, Flow equations, Mach number, Numerical integration, Parameterization.

For abstract, see STAR 1314

N75-22319/8GA PC$3.75/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Analysis of the Velocity Distribution at the Blade Tips of Axial-Flow Compressors.
H. Ufer. May 75, 27p NASA-TT-F-16366
Contract NASW-2481
Tran-Transl. Into English from Tech. Mitt. Krupp, Forschungsber., (West Germany), V. 26, No. 2, Oct. 1968 p 33-45.

Descriptors: *Air flow, *Flow characteristics, *Turbine blades, *Turbocompressors, Cascade flow, Data acquisition, Flow equations, Numerical analysis.

For abstract, see STAR 1314

N75-22621/7GA PC$3.25/MF$2.25
Houston Univ., Tex.
Silverton Conference on Applications of the Zero Gravity Space Shuttle Environment to Problems in Fluid Dynamics.
M. Eisner. 1974, 23p NASA-CR-141760
Contract NAS9-14316
Conf-Conference Held at Silverton, Colo., 6-8 Nov. 1974.

Descriptors: *Fluid dynamics, *Space shuttles, *Spacecraft environments, *Weightlessness, Biophysics, Electrokinetics, Geophysics, Mass transfer, Physiology.

For abstract, see STAR 1314

N75-22622/5GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Measurement of the Parameters of Gas-Solid Particle Flows by Optical Methods.
A. Rozenshteyn. May 75, 13p NASA-TT-F-16320
Contract NASW-2481
Tran-Transl. Into English from Izv. Akad. Nauk Est. Ssr, Fiz. Mat.(Estonian SSR), V. 23, No. 4, 1974 p 384-390.

Descriptors: *Gas-solid interfaces, *Particle motion, Doppler effect, Gas flow, Lasers, Optical equipment.

For abstract, see STAR 1314

N75-22623/3GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Unsteady Motion of a Thin Foil in an Incompressible Fluid.
D. Homentcovschi. May 75, 12p NASA-TT-F-16300
Contract NASW-2481
Tran-Transl. Into English from Stud. Cercet. Mat. (Romania), V. 26, No. 4, 1974 p 537-544.

Descriptors: *Foils (Materials), *Incompressible fluids, *Unsteady flow, Equations of motion, Hydrodynamic equations, Perturbation theory, Thin plates.

For abstract, see STAR 1314

N75-22626/6GA PC$4.25/MF$2.25
Sybucon, Inc., Atlanta, Ga.
Calculations of Unsteady Turbulent Boundary Layers with Flow Reversal.
J. F. Nash, and V. C. Patel. May 75, 55p NASA-CR-2546
Contract NAS2-7724
Subm-Prepared for Army Air Mobility R and D Lab., Moffett Field, Calif.

Descriptors: *Reversed flow, *Turbulent boundary layer, *Unsteady flow, Boundary layer equations, Numerical analysis, Time dependence, Two dimensional flow, Velocity distribution.

For abstract, see STAR 1314

N75-22628/2GA PC$5.25/MF$2.25
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Aerospace and Ocean Engineering.
Hypersonic Ionizing Air Viscous Shock-Layer Flows over Nonanalytic Blunt Bodies.
E. W. Miner, and C. H. Lewis. May 75, 111p NASA-CR-2550
Contract NAS9-12630

Descriptors: *Blunt bodies, *Hypersonic flow, *Ionized gases, *Shock layers, Axisymmetric bodies, Finite difference theory, Heat transfer, Laminar flow, Space shuttle orbiters, Viscous flow.

For abstract, see STAR 1314

N75-22630/8GA PC$9.25/MF$2.25
Geoscience, Ltd., Solana Beach, Calif.
Technology of Forced Flow and Once-Through Boiling: A Survey.
Technology Utilization.
H. F. Poppendieck, and C. M. Sabin. 1975, 311p NASA-SP-5102
Subm-Sponsored by NASA.

Descriptors: *Convective heat transfer, *Forced convection, *Pressure distribution, Boilers, Experimental design, Heat flux, Heat transfer, Pressure drop.

For abstract, see STAR 1314

N75-22640/7GA PC$3.75/MF$2.25
Unilever Research, Vlaardingen (Netherlands).
Application of Longitudinal Wave Theory to Describe Interfacial Instability.
J. H. Gouda, and P. Joos. 1975, 29p
Subm-Submitted for Publication.

Descriptors: *Interface stability, *Liquid-liquid interfaces, *Longitudinal waves, *Transport theory, Damping, Interfacial tension, Mass transfer, Navier-stokes equation, Organic liquids, Solutes.

For abstract, see STAR 1314

N75-22728/0GA PC$4.25/MF$2.25
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).

Principles and Applications of the Laser Velocimeter le Velocimetre Laser - Principes et Applications.
Oct 74, 54p VKI-TM-25
Subm-Submitted for Publication. Conf-Presented at the Ibra Seminar on "Le Laser Comme Capteur dans les Chaines de Reglage-Realisations et Perspectives," Liege, May 1974.
Language in French.

Descriptors: *Fluid flow, *Frequency analyzers, *Laser doppler velocimeters, *Velocity measurement, Flow velocity, Signal analysis, Two phase flow.

For abstract, see STAR 1314

PB-242 406/7GA PC$4.25/MF$2.25
Iowa Inst. of Hydraulic Research, Iowa City.
External Roughness Effects on the Mean Wind Pressure Distribution on Hyperbolic Cooling Towers,
Cesar Farell, and Federico E. Maisch. Aug 74, 60p IIHR-164
Grant NSF-GK-35795
Prepared in cooperation with Marley Co., Mission, Kans.

Descriptors: *Cooling towers, *Wind pressure, *Surface properties, Surface roughness, Wind tunnel models, Model tests, Hyperbolic parabolic shells, Pressure distribution, Aerodynamic configurations, Turbulent flow, Base pressure.
Identifiers: Ribs(External).

The effect of external, concentrated roughness elements or ribs on the mean pressure distributions on model hyperbolic cooling towers in uniform wind was experimentally investigated in the 5-foot low-turbulence wind tunnel of the IIHR. Several longitudinal rib configurations were tested, varying systematically rib height, rib width, and rib spacing. Three uniformly distributed, or random, roughnesses were also tested for purposes of comparison.

PB-242 446/3GA PC$3.25/MF$2.25
Mitsubishi Heavy Industries Ltd., Tokyo (Japan).
Analysis of Bow Near Field of Flat Ships.
Mitsubishi technical bulletin,
Eiichi Baba. Feb 75, 16p MTB-97

Descriptors: *Ship hulls, *Hydrodynamics, Flatness, Thinness, Mathematical models, Flow, Japan.
Identifiers: Thin ship theory, Near field, Ship bows, Bow flow.

The present analysis is an application of the bow-flow theory developed by Ogilvie (1972) to a flat ship on the free surface. Ogilvie's 'bow near field' is one which exhibits the same linear free surface conditions that are familiar from classical thin-ship theory. In this report flat ships are represented by a distribution of pressure on the waterplane z = 0. An approximate theory representing flow around bow is developed and compared with some experiments. The agreement is encouraging and suggests that the singular behavior of the pressure distribution at the edge may be related to the wave-breaking phenomenon around the bow.

PB-242 447/1GA PC$3.25/MF$2.25
Mitsubishi Heavy Industries Ltd., Tokyo (Japan).
Simulation of Bent Trailing Edge of Propellers by Shot Blasting.
Mitsubishi technical bulletin,
Takao Sasajima. Feb 75, 11p MTB-98

Descriptors: *Marine propellers, *Trailing edges, *Bending, Cavitation, Wakes, Cavitation corrosion, Hydrodynamics, Countermeasures, Simulation, Propeller blades, Model tests, Shot blasting, Japan, Cavities, Collapse.

Bent trailing edge of propeller blades was studied in view of the plastic deformation caused by cumulative impact load due to collapse of cavity. It was found out that the geometrical shape and micro-structure of bent trailing edge but also lead to a simulation method. This simulation method will be used for studying the intensity of load due to collapse of cavity quantitatively and for developing effective methods for the prediction of bent trailing edge and cavitation erosion of propellers.

20E. Masers and Lasers

AD-A011 202/9GA PC$3.25/MF$2.25
California Univ Berkeley Dept of Electrical Engineering and Computer Sciences
A Thin-Film Ring Distributed-Feedback Laser,
Won-Tien Tsang, and Shyh Wang. 19 Aug 74, 5p ARO-11833.7-EL
Grant DAHC04-74-G-0070
Availability: Pub. in Jnl. of Applied Physics, v46 n2 p838-841 Feb 75.

Descriptors: *Ring lasers, *Thin films, Feedback, Bragg angle, Waveguides, Modes, Gain, Reprints.
Identifiers: *Distributed feedback lasers.

We report the construction and operation of a ring distributed-feedback laser formed by incorporating a periodic structure as part of the plain ring laser. The characteristics of the observed spectrum are in general agreement with theoretical analysis. Mode selection and bandwidth narrowing have been observed. (Author)

AD-A011 205/2GA PC$3.25/MF$2.25
Rochester Univ N Y Dept of Physics and Astronomy
Optimum Conditions for Heterodyne Detection of Light.
Rept. for 1 Jul-30 Sep 74,
L. Mandel, and E. Wolf. 5 Oct 74, 10p ARO-12757.3-P
Grant DAHC04-74-G-0239
Availability: Pub. in Jnl. of the Optical Society of America, v65 n4 p413-420 Apr 75.

Descriptors: *Laser beams, *Coherent radiation, *Optical detection, Oscillators, Heterodyning, Signal processing, Apertures, Sizes(Dimensions), Signal to noise ratio, Receivers, Light pulses, Diffraction, Variations, Oscillation, Reprints.
Identifiers: Fluctuations.

The problem of detecting a coherent light beam in the presence of unwanted background radiation by the heterodyne method is examined. For a sufficiently strong local-oscillator field, the detectability of the signal is unaffected by the presence of the background radiation. It is shown that, in general, there exists an optimum receiver size that maximizes the signal-to-noise ratio. This result is illustrated by several examples. A procedure for the detection of a light signal of unknown direction is suggested. (Author)

AD-A011 237/5GA PC$3.25/MF$2.25
Army Mobility Equipment Research and Development Center Fort Belvoir Va
Gallium Arsenide Lasing Diode Evaluation.
Final rept.,
Allen C. Johnson. Feb 75, 16p Rept no. USAMERDC-2129

Descriptors: *Gallium arsenide lasers, *Diodes, Performance(Engineering), Temperature, Electric current.

This study was undertaken to relate the output power of certain Gallium Arsenide (GaAs) infrared lasers to the type of laser, to input current, and to temperature while pulse width and repetition rate are held constant. An initial objective, to evaluate long-term reliability of the lasers, was discontinued because the diodes under test were made obsolete by technological advances.

AD-A011 241/7GA PC$3.75/MF$2.25
Army Electronics Command Fort Monmouth N J
Experiments on Continuous Transverse Discharges in Channel Waveguides with Flowing CO2 Gas Mixtures.
Final technical rept.,
A. Funisawa, and A. Papayoanou. May 75, 26p Rept no. ECOM-4326

Descriptors: *Gas discharges, *Carbon dioxide lasers, Gas flow, Optical pumping, Glow discharges.
Identifiers: Population inversion(Energy levels).

Experiments on CW transversely excited (TE) flowing CO2 gas mixtures are described. Several discharge and flow geometries at pressures up to 1 atm have been used to determine discharge properties in the channels used. Optical gain has not been measured in these channels but analysis of the experimental results indicates how optimum population inversion is to be obtained. The analysis also reveals that prevention of glow to arc transitions in these CW TE discharges requires that one operate within certain physical parameter ranges. Such parameters are identical to those which optimize population inversion.

AD-A011 287/0GA PC$3.25/MF$2.25
IBM Thomas J Watson Research Center Yorktown Heights N Y
Study of Ultraviolet Lasers.
Final rept. 1 Mar 75-28 Feb 75,
R. Dreyfus. 1975, 23p ARO-10437.13-P
Contract DAHC04-74-C-0013
See also AD-779 470.

Descriptors: *Ultraviolet lasers, *Optical pumping, Electron beams, Excitation, Far ultraviolet radiation, Tunable lasers, Performance(Engineering), Ion beams, Xenon.
Identifiers: *Xenon lasers.

The present work deals with the generation of coherent light in the UV (4000 A to 2000 A) and VUV (<2000 A) spectral regions. During the present reporting period, research has been directed toward detailed measurements and calculations leading to a better understanding of the VUV lasers, improved laser engineering, using harmonic generation as an alternative to direct excitation, and investigating ion beams as a new means of exciting laser media. The overall goal has been to seek more efficient pumping schemes in order to better deal with the problem of even larger excitation powers required at still shorter wavelengths.

AD-A011 318/3GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Optically Pumped Vibrational Transition Laser in OCS.
Journal article,
Howard R. Schlossberg, and Harold R. Fetterman. 26 Aug 74, 4p Rept no. JA-1442
ESD-TR-75-161
Contract F19628-73-C-0002
Availability: Pub. in Applied Physics Letters, v26 n6 p316-318, 15 Mar 75.

Descriptors: *Optical pumping, *TEA lasers, Carbon dioxide lasers, High power, Vibration, Molecules, Infrared lasers, Reprints.
Identifiers: Carbonyl sulfide.

Laser oscillation between vibrational states has been demonstrated at 19 micrometers in OCS by optical pumping on the v sub 2 overtone with a CO2 TEA laser. Analysis of the molecular

kinetics indicates this technique to be general and capable of yielding many high-power (>1000 W) laser lines below 50 micrometers. (Author)

AD-A011 395/1GA PC$5.75/MF$2.25
Missouri Univ Rolla Dept of Engineering Management
Data Collection and Analysis Program.
Final rept. 1 Feb-31 Oct 74,
Henry A. Wiebe, and James K. Byers. Oct 74, 128p ARO-12110.1-RTL
Grant DAHC04-74-G-0099

Descriptors: *Chemical lasers, *Computer programs, *Data processing, Gas dynamics, Data acquisition, Mass flow, Computations, FORTRAN, Curve fitting, Plotters.
Identifiers: HUNT1 computer program, HUNT2 computer program, HUNTM computer program, CalComp plotters, FORTRAN 4 programming language.

This manual contains the necessary information to implement and maintain the laser computer programs. Three separate program segments are used for data collection and analysis at the Chemical Laser Facility. Program segment HUNT1 is used to collect the data, program segment HUNT2 is used to reduce and analyze the data while program segment HUNTM is used to manage the associated data files.

AD-A011 427/2GA PC$4.25/MF$2.25
Hughes Aircraft Co Culver City Calif Laser Div
Chemical Laser Technology.
Final rept. 30 May 74-15 Jun 75.
Jun 75, 53p Rept nos. HAC-P75-191, HAC-Ref-D1687
Contract N00014-74-C-0363

Descriptors: *Mixing, *Chemical lasers, *Gas dynamics, Gas flow, Electron beams, Electron probes, Diffusion, Nozzles, Electron guns, Mathematical models.
Identifiers: Deuterium fluoride lasers.

The objectives of this program are to further elucidate the gasdynamic and kinetic processes in the laser cavity of a cw HF/DF chemical laser. The plan was to collect new diagnostic data on several chemical laser nozzles for different cavity fuels including D2, DBr, and DI; and to use this information to develop an improved macroscopic description of the laser fuel/oxidizer mixing process. The baseline description of the mixing process is a one-dimensional, laminar-diffusion model which was developed earlier. Here it is shown that two-dimensional, laminar diffusion is the square root of 3 times faster than 1-d diffusion. A critical feature in the development of the diagnostic techniques is the use of a pulsed electron beam probe to obtain high-spatial-resolution, number density data. Analysis of the pulsed system is presented along with its advantages over the more conventional cw e-beam probe. Work is continuing on the pulsed e-beam diagnostic. Necessary support data measurements on several nozzle configurations have been obtained and are reported along with limited systems analysis which supports the use of halogen fuels in large DF/HF chemical laser systems.

AD-A011 510/5GA PC$3.25/MF$2.25
United Aircraft Research Labs East Hartford Conn
Determination of Vibration-Rotation Line Strengths for HF and DF by Use of an HF/DF CW Laser,
J. J. Hinchen. 19 Dec 73, 4p AFOSR-TR-75-0779
Contract F44620-70-C-0114
Availability: Pub. in Jnl. of the Optical Society of America, v64 n9 p1162-1163 Sep 74.

Descriptors: *Infrared lasers, *Hydrogen fluoride, *Deuterium compounds, *Absorption spectra, *Continuous wave lasers, Spectrometers, Fluorides, Gold, Germanium, Infrared detectors, Line spectra, Laser beams, Wavelengths, Ultrahigh frequency, Laser cavities, Bandwidth, Tunable lasers, Isotopes.
Identifiers: HF/DF lasers, *Hydrogen Fluoride/Deuterium fluoride lasers.

A small cw mixing laser operating on a single wavelength and tunable over about 400 MHz was used to measure absorption coefficients for Hydrogen fluoride and Deuterium flouride in the Doppler-broaded region and for HF in the pressure-broadened regime. At low pressure, the line profile was experimentally determined and from measurements at line center, values were obtained for the radiative lifetime of HF and DF of .00616 and .00313 s, respectively. High-pressure measurements yielded the value of 1.30x10 to the 8th power for s torr the HF optical-broadening collision frequency.

AD-A011 590/7GA PC$5.25/MF$2.25
TRW Systems Group Redondo Beach Calif
High Altitude Laser Technology Studies.
Final rept. 24 Mar-15 Oct 74,
S. G. Forbes, G. Emanuel, W. G. Gaskill, T. A. Jacobs, and A. Witte. Jun 75, 123p AFWL-TR-74-210
Contract F29601-74-C-0073

Descriptors: *Chemical lasers, *Chain reactions, *Gas flow, Reaction kinetics, Continuous wave lasers, Performance(Engineering), Gas dynamics, Experimental design, Hydrogen fluoride, Computer applications.
Identifiers: *Hydrogen fluoride lasers.

The performance potential of a continuous wave (cw) laser operating on the hydrogen fluoride chain reaction are predicted analytically using computer models for mixing dynamics, fluid mechanics, and laser kinetics. The results show very favorable performance; however, experimental data from pulsed and cw experiments fall below the predictions by factors of approximately 4 and 30, respectively. Possible reasons for this disagreement include (1) use of incorrect rate coefficients in the model, (2) fluid mechanical/reactive flow interactions in the cavity not included in the model, and (3) inadequate control of the variables in the experiments. These possibilities are discussed in some detail and it is recommended that experimental work in each area should be undertaken concurrently so that the performance potential of the HF chain reaction can be evaluated in a timely manner.

AD-908 291/8GA PC$3.75/MF$2.25
McDonnell Douglas Astronautics Co.-East St. Louis, Mo.
High Data Rate Modulator.
Final rept. 1 Nov 71-26 Sep 72,
A. J. Chenoweth, and W. E. Heafner. Feb 73, 47p AFAL-TR-72-427
Contract F33615-72-C-1380
Distribution Limitation now Removed.

Descriptors: *Modulators, *Optical communications, Lasers, Electrooptics, Data transmission systems, Infrared communications, Digital systems, Lithium compounds, Tantalum compounds, Crystals, Neodymium.
Identifiers: Lithium tantalate, Tantalates, Yag alloys, *Optical modulators.

The objective of this program was to design, develop, fabricate and deliver two digital modulator/drivers. One modulator/driver was to operate at 0.53 micrometer wavelength and the other at 1.06 micrometers wavelength. The design approach used the electro-optic properties of lithium tantalate, a modulator material, and combined solid state modulator drivers and associated electronics into a compact package. Each modulator unit consisted of a modulator subassembly, modulator driver, temperature controller, automatic electronic compensator, and manual compensator. The performance of both modulator units was evaluated under typical operating conditions. A 500 MBPS Nd-YAG laser provided the optical input for modulator tests, and frequency doubling was used to provide the 0.53 micrometer signal.

AD-921 515/3GA PC$4.75/MF$2.25
Perkin-Elmer Corp., Norwalk, Conn.
Laser Wavefront Analyzer Using Sliding Reference Interferometry. Volume II. Subsystem Design Analysis.
Final rept. 1 Sep 73-4 Mar 74,
M. L. Skolnick, S. Gowrinathan, J. S. Harris, L. J. Medico, and F. E. Roberts. Jul 74, 92p PE-11857-Vol-2 AFWL-TR-74-73-Vol-2
Contract F29601-74-C-0011
Distribution Limitation now Removed.

Descriptors: *Laser beams, *Interferometers, *Wave analyzers, *Data processing, Phase distortion, Differential analyzers, High power, Optical data, Sampling, Wavefronts, Intensity, Distribution functions, Polarization, Phase measurement, Algorithms, Signal processing.

This final report describes a preliminary design and detailed performance analysis of a laser wavefront analyzer system. The laser wavefront analyzer is a complete diagnostic system for measuring at high frame rate the two-dimensional optical phase and intensity distributions of a high-power laser beam. The complete system includes a high-power laser beam sampler, the diagnostic instrumentation, and a data recording, processing, and display system. The laser wavefront analyzer system is based on the new sliding reference interferometer concept developed and breadboarded during this program. This interferometer is a differential optical phase measurement instrument that is insensitive to the fluctuations in amplitude, polarization, and wavelength, which are characteristic of a high-power laser radiation.

AD-922 980/8GA PC$6.25/MF$2.25
United Aircraft Research Labs., East Hartford, Conn.
Laser Wavefront Analyzer Using Frequency Offset Interferometry.
Final rept. 21 Aug 73-18 Mar 74.
A. W. Angelbeck, W. C. McClurg, E. Hasselmark, G. E. Palma, and S. N. Mapes. Jul 74, 153p UARL-N911750-6 AFWL-TR-74-26
Contract F29601-74-C-0012
Distribution Limitation now Removed.

Descriptors: *Wave analyzers, *Infrared lasers, *Interferometers, *Carbon dioxide lasers, Laser beams, Wavefronts, Frequency shift, Infrared scanning, Mirrors, Sampling, Collimators, Diffraction gratings, Alignment, Far infrared radiation, Beam splitting, Thermal stability, Doppler effect, Doppler systems, Rotation, Phase detectors, Acoustoptics, Mixing, Information theory.
Identifiers: Autocollimators, Laser local oscillators, Local oscillators, Mixers(Optical).

The laser wavefront analyzer has as its primary goal the measurement of the spatial distribution of the phase and intensity of a high power (9.2 to 10.7 micrometers) laser wavefront at high framing rates. The objectives of this study were: (1) to arrive at a preliminary baseline design for a laser wavefront analyzer that would meet as many of the original design coals as possible, and (2) to investigate the cost/complexity savings that could be achieved by relaxing some of the performance specifications of the baseline design. The baseline design for the laser wavefront analyzer consists of four major subsystems. These are the beam sampler subsystem, the autoalignment subsystem, the optical subsystem, and the data acquisition subsystem.

COM-75-50371/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Extension of Absolute Frequency Measurements to 148 THz: Frequencies of the 2.0-and 3.5-microm Xe.
Final rept.,
D. A. Jennings, F. R. Petersen, and K. M. Evenson. May 75, 2p
Pub. in Applied Physics Letters, v26 n9 p510-511, 1 May 75.

Descriptors: *Frequency measurement, *Near infrared radiation, Gas lasers, Spectral lines.
Identifiers: Reprints, *Xenon lasers.

Absolute infrared frequency measurement has been extended to 148 THz (the highest frequency ever directly measured) with measurement of the two strong cw laser lines of Xe. The frequencies were synthesized with stabilized CO2 and 3.39 micrometer He-Ne lasers and mixed on a W-Ni point-contact diode. The measured frequencies are nu(Xe(2.0 micrometers))=147.915 850(15) THz and nu(Xe(3.5 micrometers))=85.459 997(3) THz.

NTIS/PS-75/539/7GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Dye Lasers (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Kirk G. Werner, and Edward J. Lehmann. Jul 75, 178p*
Supersedes NTIS/PS-74/120.

Descriptors: *Dye lasers, *Bibliographies, Design, Performance, Cyanine dyes, Optical pumping, Abstracts, Molecular energy levels.
Identifiers: Laser spectroscopy, Xanthene dyes, Tunable lasers, Mode locked lasers, Continuous wave lasers.

The bibliography covers all aspects of dye lasers. Included are references on tuning, optics, pumping, molecular energy levels, and dye laser spectroscopy. (Contains 173 abstracts).

N75-22733/0GA PC$4.25/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Vibrational Energy Production by Electric Discharge in a Supersonic Flow la Production d'Energie Vibrationnelle Par Decharge Electrique dans UN Ecoulement Supersonique.
B. Gautier, R. Joeckle, and G. Stern. 8 Jul 74, 56p ISL-22/74
Contract DRME-73/571
Language in French.

Descriptors: *Carbon dioxide lasers, *Electric discharges, *Energy conversion efficiency, *Supersonic flow, *Vibration mode, Boundary layers, Correlation detection, Laser outputs, Power gain, Pressure distribution, Stability.

For abstract, see STAR 1314

N75-22734/8GA PC$3.25/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Development of a High Performance Carbon Dioxide Gas Laser Medium Using an Electric Discharge in a Supersonic Flow Erzeugung Eines CO2-Laser-Mediums fuer Hoheleistung durch Eine Elektrische Entladung in Einer Ueberschallstroemung.
B. Gautier, R. Joeckle, H. Nett, and G. Stern. 19 Apr 74, 17p ISL-CO-6/74
Language in German.

Descriptors: *Carbon dioxide lasers, *Electric discharges, *Laser outputs, *Supersonic flow, Amplification, Flow characteristics, Gas discharge tubes, Gas flow, Molecular excitation, Wind tunnel tests.

For abstract, see STAR 1314

PATENT-3 879 686 Not available NTIS
Department of the Air Force Washington D C
Laser System for Producing Variable Duration Short Pulses.
Patent,
David Milam, Howard Schlossberg, and Abraham Szoke. Filed 20 Sep 73, patented 22 Apr 75, 5p Rept nos. PAT-APPL-399 010,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Pulsed lasers, *Patents, Light pulses, Optical pumping, Interferometers, Mirrors, Laser modulators.
Identifiers: PAT-CL-331-94-5-M.

The patent discloses a laser system for producing intense variable duration short pulses in the range of 0.1 to 3.0 nanoseconds. The laser system uses a Michelson interferometer set for maximum reflection at the lasing frequency as one end element. A phase or amplitude switch is placed in the cavity in front of the interferometer in order to change the input to the interferometer resulting in a pulse out of the interferometer whose duration is given by twice the difference in path length of the interferometer arms divided by the speed of light.

20F. Optics

AD-A011 157/5GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Form and Intrinsic Birefringence,
Victor Twersky. 11 Oct 74, 8p Rept no. SI-25
Contract N00014-67-A-0467-0027, Grant NSF-GP-33368X
Availability: Pub. in Jnl. of the Optical Society of America, v65 n3 p239-245 Mar 75.

Descriptors: *Birefringence, *Refractive index, *Ellipsoids, Anisotropy, Polarization, Maxwells equations, Reprints.

AD-A011 328/2GA PC$3.25/MF$2.25
Polytechnic Inst of New York Farmingdale Long Island Graduate Center
Ray Method for Scattering by Discontinuities in a Multiwave Wave Guide,
L. W. Chen, and L. B. Felsen. 27 Dec 72, 21p
AFOSR-TR-75-0728
Contract F44620-69-C-0047, Grant NSF-GK-10917
Availability: Pub. in SIAM Jnl. on Applied Mathematics, v27 n1 p138-158 Jul 74.

Descriptors: *Optical waveguides, *Plasma medium, Ray tracing, Scattering, Discontinuities, Diffraction, Reprints.

The ray optical theory developed previously for scattering by discontinuities in wave guides is extended to the case where the wave-guide medium supports two wave species. Examples of such media are compressible plasmas with constituent electromagnetic and acoustic waves, elastic solids with compressional and shear waves, and others. After deriving the modal excitation coefficients due to a source with prescribed directive radiation pattern, these results are applied to reflection from a bifurcation discontinuity in a compressible-plasma wave guide. Modal reflection and coupling coefficients are computed by accounting for primary and multiple diffraction at the bifurcation edge. Numerical results, illustrating the effects of wave coupling are explained in terms of fundamental ray optical scattering mechanisms. (Author)

AD-A011 466/0GA PC$3.25/MF$2.25
Dayton Univ Ohio Dept of Physics
Luminescence in Electron Irradiated Cadium Sulphide.
Journal article,
C. N. Elsby, and J. M. Meese. 1974, 10p ARL-75-0120
Contract F33615-71-C-1877
Availability: Pub. in IEEE Transactions on Nuclear Science, vNS-21 p14-20 Dec 74.

Descriptors: *Luminescence, *Electron irradiation, Cadmium sulfides, Cathodoluminescence, Photoluminescence, Broadband, Annealing, Wavelengths, Damage, Reprints.

Electron irradiation induced changes in both the photo- and cathodo-luminescence spectra of high purity CdS platelets have been monitored over a wave-length range from 4800A to 2 micrometers. The irradiations were all performed near 10K using beam energies from 100 keV to 1 MeV. By irradiating with electron energies between the cadmium and sulfur displacement thresholds, and above the cadmium displacement threshold, the damage induced luminescence could be assigned to specific sublattices. In the bound exciton spectral region near the band edge, all exciton lines present before irradiation were observed to decrease in intensity with the exception of the emission line at 4867A The edge emission was found to decay in intensity when observed by photoluminescence but to increase in intensity when excited by 100 keV electrons following an irradiation above the sulfur displacement threshold.

AD-A011 492/6GA PC$3.25/MF$2.25
Stanford Research Inst Menlo Park Calif
Techniques for the Microfabrication of Integrated Optical Waveguide Couplers.
Quarterly technical rept. no. 1, 24 Jan-24 Apr 75,
E. R. Westerberg. 24 Nov 75, 17p
Contract N00014-75-C-0434, ARPA Order-2327

Descriptors: *Optical waveguides, *Couplers, Coatings, Fabrication, Electron beams, Lithography, Lithium compounds, Niobates, Integrated systems, Titanium, Diffusion.
Identifiers: Integrated optics, Lithium niobates, Optical couplers.

During this quarter progress was made toward accomplishing the objective of this program, namely, the development of an electron-beam projection exposure system (EPES) capable of producing integrated optical circuits. Efforts were concentrated on basic improvements in the electron exposure system to increase the area of exposure for a single pattern and to develop methods of producing multiple-registered exposure patterns. The results obtained thus far are: (1) The EPES illumination system has been improved to provide an area of illumination 100% larger than that of the previous system; (2) A rotary mask holder has been designed, which will allow the formation of up to eight different registered exposure patterns. Concentrated research work has also been carried out to develop the transmission mask fabrication technology to allow reproducible electron-beam mask construction.

AD-A011 529/5GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Optical Analogs of Magnetic Resonance Spectroscopy,
J. I. Steinfeld. 1974, 37p AFOSR-TR-75-0686
Grant AF-AFOSR-2032-71
Availability: Pub. in Chemical and Biochemical Applications of Lasers, v1 p103-138 1974.

Descriptors: *Spectroscopy, *Magnetic resonance, *Lasers, Optics, Coherent radiation, Relaxation time, Reprints.
Identifiers: Double resonance.

A variety of coherent spectroscopic effects, which are optical analogs of magnetic resonance phenomena, are described. These include optical nutation, photon echoes, double resonance, and optically detected magnetic resonance. Density natrix methods are described for treating these problems. (Author)

AD-A011 550/1GA PC$4.25/MF$2.25
Colorado Univ Boulder Electromagnetics Lab
General Theory of Surface-Wave Propagation on a Curved Optical Waveguide of Arbitrary Cross-Section.
Interim rept.,
David C. Chang, and Edward F. Kuester. Feb 75, 62p Rept no. Scientific-11 AFOSR-TR-75-0799
Grant AF-AFOSR-2417-72

Descriptors: *Dielectric waveguides, *Optical waveguides, *Acoustooptics, Integrated circuits, Fiber optics, Surface waves, Wave propagation, Curvature, Mathematical analysis.
Identifiers: Acoustic surface waves, Integrated optics, Slabs.

The surface-wave propagation on a curved optical waveguide of arbitrary cross-section is calculated. A formulation is employed which retains much of the simple physical interpretation of the slab case. Specific attention is given to the case where the guided mode does not possess any symmetry with respect to the bending axis. In this case the change in propagation constant for such a situation can cause not only a significant additional phase shift around the bend, but also quite sizeable enhancement or reduction in the amount of continuous radiation loss. For the circular symmetry cross-section the results agree except for a factor of 1/2 with previous calculations obtained by an integral representation of fields.

AD-A011 551/9GA PC$4.75/MF$2.25
Colorado Univ Boulder Electromagnetics Lab
Microwave Model Study of Optical Dielectric Slab Waveguide.
Interim rept.,
H. A. Haddad, S. W. Maley, and D. C. Chang. Mar 75, 95p Rept no. Scientific-12 AFOSR-TR-75-0800
Grant AF-AFOSR-2417-72

Descriptors: *Dielectric waveguides, *Optical waveguides, *Acoustooptics, Radiation effects, Integrated circuits, Waveguide couplers, Surface waves, Mathematical models, Far field, Computer programs, Curvature, Computer programs.
Identifiers: Integrated optics, Slabs, Acoustic surface waves.

The objective of this work is to investigate the characteristics of dielectric slab waveguides frequently used in integrated optics by a microwave modeling technique. The study includes excitation of a surface wave mode in a low loss dielectric waveguide as well as coupling between two similar (degenerate mode) and different (non-degenerate) waveguides. The experimental data indicate the coupling length is short for the non-degenerate, and decreases as the separation between the two guides decreases for either case (degenerate or non-degenerate). The authors also investigated the field characteristics outside a curved slab and the containment of radiation. Also included in this work is the investigation of far field pattern for guides with different radii of curvature.

AD-A011 599/8GA PC$3.75/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
A Fully Tunable Lyot-Ohman Filter.
Instrumentation papers,
Jacques M. Beckers, Larry Dickson, and Randy S. Joyce. 10 Feb 75, 27p Rept nos. AFCRL-IP-227, AFCRL-TR-75-0090

See also report dated Mar 73, AD-778 096.

Descriptors: *Optical filters, *Telescopes, Tuning, Birefringence, Astronomical instruments, Solar activity.
Identifiers: Lyot-Ohman filters.

Properties of the Zeiss universal birefringent filter and its optical and electronic interface with the Sacramento Peak Observatory's vacuum telescope are described. The instrument permits observations of solar intensities, velocities and/or magnetic fields in rapid succession in any Fraunhofer line in the 410 to 700 nm wavelength region with high spectral (0.004 to 9.013 nm) and high spatial (approximately 1/3 arc second) resolution.

AD-A011 609/5GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
10.6 micrometer Pulsed Laser Damage in ZnSe,
H. Posen, J. Bruce, and D. Milam. 18 Jun 75, 13p Rept no. AFCRL-TR-75-0336

Descriptors: *Infrared windows, *Zinc selenides, *Radiation effects, *Infrared optical materials, Laser materials, Infrared lasers, Carbon dioxide lasers, Twinning(Crystallography), Electron microscopy, X ray diffraction, Microscopy, Grain boundaries.

The effect of 10.6 micrometer pulsed laser radiation on large grain ZnSe is examined with respect to the local crystallography of the material. In particular, the presence of twin boundaries, a common defect in II-VI materials, is shown to have very little effect on the damage threshold. Damage effects were monitored by Nomarski interference contrast microscopy, electron microscopy and x-ray topography.

AD-A011 610/3GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
A Comparison of 10.6 micrometer Pulsed Laser Damage in Sputtered vs Electron Beam Deposited Ge-Coated KCl,
A. Golubovic, W. Ewing, J. Bruce, J. Comer, and D. Milam. 18 Jun 75, 12p Rept no. AFCRL-TR-75-0335

Descriptors: *Infrared optical materials, *Coatings, *Germanium, *Potassium chloride, *Radiation effects, *Infrared windows, Laser materials, Infrared lasers, Carbon dioxide lasers, Electron beams, Sputtering, Crystal growth, Pulsed lasers.

Germanium films deposited on KCl substrates by electron beam and sputter techniques have been irradiated at 10.6 micrometers. A comparative damage study of germanium films prepared by these techniques under pulsed apparatus was used for this study. Well characterized RAP Bridgeman and Czochralski grown KCl substrates with (100) and (111) orientation were used.

AD-A011 614/5GA PC$4.25/MF$2.25
Rand Corp Santa Monica Calif
Method for Estimating the Thermal Blooming Effect.
Interim rept.,
C. C. Chen. Apr 75, 73p Rept no. R-1726-PR
Contract F44620-73-C-0011

Descriptors: *Laser beams, *Thermal blooming, Atmospheric motion, Heat, Light transmission, Numerical analysis, Equations, Target detection, Continuous wave lasers.
Identifiers: *Atmospheric attenuation.

The report describes a simple method without the use of codes which has been developed to estimate the thermal blooming of a high-power focused laser beam propagating through an absorbing medium. Continuous wave laser beam propagation through an absorbing medium, heats the medium along the path of the beam, the heating of the medium then induces a local change in the index of refraction of the medium which, in turn, causes some effects of spreading, distorting, bending, or defocusing of the beam. These are known as thermal blooming or thermal lensing effects. One important consequence of these effects is to spread the laser beam over a larger area, thereby reducing the intensity incident on a target. The method described in this report permits the approximate estimation of the reduction of laser intensity on the target, but not the detailed intensity pattern caused by the thermal blooming effect.

AD-A011 642/6GA PC$3.75/MF$2.25
Rand Corp Santa Monica Calif
Attenuation of Electromagnetic Radiation by Haze, Fog, Clouds, and Rain.
C. C. Chen. Apr 75, 39p Rept no. R-1694-PR
Contract F44620-73-C-0011

Descriptors: *Electromagnetic radiation, *Aerosols, *Light transmission, Coefficients, Infrared detection, Optical detection, Atmospheric windows, Clouds, Fog, Rain, Remote detectors, Handbooks, Target acquisition, Terminal guidance.
Identifiers: *Atmospheric attenuation.

The report assembles, under one cover, the values of aerosol attenuation coefficients of regions in the electromagnetic (EM) spectrum containing so-called 'atmospheric windows,' in which EM radiation suffers the least amount of atmospheric gaseous absorption. The purpose is to enable rapid quantitative assessment of target acquisition terminal guidance sensors using the windows during adverse weather. Both calculated and available measured values are presented. Being a compilation drawn from numerous sources, the report is intended more as a handbook for ready use than as a theoretical treatise.

AD-A011 644/2GA PC$3.75/MF$2.25
Rand Corp Santa Monica Calif
Far Infrared and Submillimeter Scattering. II. Attenuation by Clouds and Rain,
D. Deirmendjian. Feb 75, 38p Rept no. R-1718-PR
Contract F44620-73-C-0011
See also report dated Feb 74, AD-787 205.

Descriptors: *Electromagnetic scattering, *Far infrared radiation, *Submillimeter waves, *Radiation attenuation, Rain, Clouds, Drops, Raindrops, Mie scattering, Distribution functions, Windows, Atmospheric scattering, Light scattering.
Identifiers: *Atmospheric attenuation.

The report provides reliable estimates of the attenuation of radiation at such wavelengths through various types of water clouds as well as moderate and heavy rain. The attenuation properties of hydrometeors are of prime interest. In particular, the use of some new cloud- and raindrop-size distribution models that were developed for this study is described and justified. Attenuation computations for these models are presented, and these estimates are then analyzed and compared with other work and with observation. Results imply that interference with current tactical air operations by clouds and fog can be substantially reduced if target acquisition and munitions guidance systems that operate at frequencies near 230 GHz can be developed.

AD-A011 653/3GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass

Elastic Constant Measurements of Polycrystalline Infrared Window Materials,
S. A. Kulin, R. Salzbrenner, and H. Posen. 17 Jun 75, 21p Rept no. AFCRL-TR-75-0333

Descriptors: *Infrared windows, *Infrared optical materials, *Laser materials, *Elastic properties, Potassium chloride, Zinc selenides, Modulus of elasticity, Shear properties, Bulk modulus, Poisson ratio, Ultrasonic tests, Anisotropy.
Identifiers: Chemical vapor deposition.

In this work elastic constants of some infrared window materials were calculated from ultrasonic measurements using a pulse overlap technique. Velocity measurements were determined in various directions in CVD zinc selenide and in hot forged KCl alloy windows. These measurements permitted the determination of Young's Modulus, the shear modulus, the bulk modulus, and Poisson's ratio. Some anistropy was found in the elastic properties of these fabricated or 'as-grown' infrared windows. For example, in the case of the chemically vapor deposited ZnSe which exhibits a small amount of elastic anistropy, the elastic properties were found to be isotropic in all directions normal to the growth direction. The modulus values observed for directions in the plane of the zinc selenide window were found to change by approximately two percent when measured in directions parallel to the plate growth direction. The experimental results obtained were, in some cases, compared with various calculation approximations which yield polycrystalline elasticity parameters from single crystal data.

COM-75-50358/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Simple, Adjustable Lens Holder.
Final rept.,
D. A. Jennings. Apr 75, 2p
Pub. in Review of Scientific Instruments, v46 n4 p487-488 Apr 75.

Descriptors: *Lenses, *Holders, Optical equipment.
Identifiers: Reprints.

The construction of a simple, adjustable lens holder is described. This lens holder is unique in that it will firmly hold small lenses without taking up space at the edge of the lens or stopping them down.

N75-22727/2GA PC$3.25/MF$2.25
Materials Research Labs., Maribyrnong (Australia).
The Effect of Aerosols and Turbulence on the Transmission of High-Power Laser BEAMS.
B. C. H. Wendlandt. Feb 75, 20p REPT-621

Descriptors: *Aerosols, *Atmospheric turbulence, *Laser applications, Particle size distribution, Thermal blooming, Wavelengths.

For abstract, see STAR 1314

N75-22732/2GA PC$3.75/MF$2.25
Royal Radar Establishment, Malvern (England).
Design and Production of Optical Two Layer Coatings with the Aid of Smith'S Circle Diagram.
N. A. Lowde. Apr 74, 48p RRE-TN-765, BR42837

Descriptors: *Antireflection coatings, *Electrical impedance, *Evaporation, *Laser materials, *Smith chart, Dielectrics, Glass, Lithium niobates, Optical thickness, Silicon dioxide, Thin films.

For abstract, see STAR 1314

N75-23047/4GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Effect of Molecular Anisotropy on the Intensity and Degree of Polarization of Light Scattered from Model Atmospheres.
O. P. Bahethi, and R. S. Fraser. Apr 75, 28p NASA-TM-X-70879, X-910-75-52

Descriptors: *Anisotropy, *Atmospheric models, *Light scattering, *Polarization (Waves), Aerosols, Atmospheric refraction, Optical properties, Optical thickness, Radiative transfer, Rayleigh scattering, Stokes law of radiation.

For abstract, see STAR 1314

N75-23238/9GA PC$3.75/MF$2.25
Materials Research Labs., Maribyrnong (Australia).
The Determination of Colorimetric Values of Colours to Bs 381C.
R. J. Hancox, and L. A. Hill. Dec 74, 40p REPT-620

Descriptors: *Color, *Spectrometers, Australia, Brightness, Colorimetry, Contrast, Darkness.

For abstract, see STAR 1314

N75-23276/9GA PC$3.75/MF$2.25
Steinmetz (William J.), Garden City, N.Y.
The Effect of Thin Turbulent Shear Layers on the Optical Quality of Imaging Systems.
W. J. Steinmetz. Apr 75, 41p NASA-CR-137666 Contract NAS2-8066

Descriptors: *Imaging techniques, *Optical properties, *Shear layers, *Turbulent boundary layer, Airborne equipment, Atmospheric turbulence, C-141 aircraft, Infrared imagery, Mathematical models, Reflecting telescopes, Spoilers, Wind tunnel tests.

For abstract, see STAR 1314

N75-23340/3GA PC$3.75/MF$2.25
Weapons Research Establishment, Salisbury (Australia).
The Computation of Growth Charts and the Effect of Layer Thickness Variations for Thin Film Interference Filters.
M. S. Brown. Dec 74, 28p WRE-TN-1311(AP)

Descriptors: *Computer programs, *Image filters, *Optical thickness, *Thin films, Absorption spectra, Dielectrics, Fabry-perot interferometers, Light transmission, Refractivity.

For abstract, see STAR 1314

PAT-APPL-559 863/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Mirror Steering System.
Patent Application,
Richard P. Pledger. Filed 19 Mar 75, 10p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Mirrors, *Beam steering, Patents, Control systems, Steering.
Identifiers: *Patent applications, PAT-CL-350-299.

The patent application describes a system for steering a mirror, comprising a mirror mounted on a gimbal provided with a steering rod and incorporated into an articulated spatial parallelogram linkage to allow for steering the mirror in a precise and controlled manner.

PAT-APPL-561 769/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Fiber Optics Connector with Linear X-Y Register.
Patent Application,
David A. Zann. Filed 25 Mar 75, 9p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Fiber optics, Connectors, Electrooptics, Transducers, Light emitting diodes, Photodiodes, Alignment, Optical equipment, Patents.
Identifiers: *Patent applications, PAT-CL-350-96.

The patent application discloses a fiber optics connector having a plurality of slide blocks mounted in recesses in a support base member, which are moved in the X and Y directions by adjustment screws against spring members. The base member is supported on a linear logic card assembled by means of bracket members secured to the support base member. Adjustment of the slide blocks permit the aligning of the end of the fiber optics bundle with electro-optic transducers such as light emitting diodes or photo diodes to optimum response.

PATENT-3 880 527 Not available NTIS
Department of the Air Force Washington D C
Annular Beam Radial Scanner.
Patent,
Dennis N. Mansell. Filed 23 Sep 71, patented 29 Apr 75, 6p Rept nos. PAT-APPL-183 002,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Laser beams, *Optical scanning, *Patents, Monitors, Carbon dioxide lasers, Power measurement.
Identifiers: PAT-CL-356-213.

This patent relates generally to the laser art and, more particularly, to apparatus for scanning an annular shaped light beam emitted by a laser. With the rapid advance in the laser state-of-the-art, it has become possible to have a laser, such as a conventional CO2-N2-He laser, emit or produce an annular shaped light beam. This invention pertains to apparatus for scanning any desired preselected annular portion of an annular shaped light beam and ascertaining the power output of said preselected annular portion.

PB-242 086/7GA PC$3.25/MF$2.25
Arizona Univ., Tucson. Optical Sciences Center.
Research Applied to Solar-Thermal Power Conversion. Volume 1. Executive Summary.
Final rept. 1 Jun 71-31 Jan 73,
Aden Meinal. 1973, 21p NSF/RANN/SE/GI-30022/FR/73/1-Vol-1 NSF/RA/N-73-010
Grant NSF-30022, Contract F33615-68-C-7111
See also PB-242 087.

Descriptors: *Solar collectors, *Solar energy absorbers, *Optical coatings, Antireflection coatings, Silicon, Absorption, Emittance, Cost estimates, Performance evaluation, Solar power generation, Solar energy concentrators.
Identifiers: Chemical vapor deposition.

This report summarizes studies of solar absorbing coatings of high selectivity, (a/e), and their influence on system design, operation, and economics. Two basically different approaches to high (a/e) coatings were followed: (1) interference thin film coatings and (2) intrinsic absorber coatings using chemically vapor-deposited (CVD) silicon as the absorbing component.

PB-242 087/5GA PC$7.25/MF$2.25
Arizona Univ., Tucson. Optical Sciences Center.
Research Applied to Solar-Thermal Power Conversion. Volume II. Final Report.
Final rept. 1 Jun 71-31 Jan 73,

Aden Meinal. 31 Jan 73, 215p
NSF/RANN/SE/GI-30022/FR/73-Vol-2
NSF/RA/N-73-011
Contract F33615-68-C-7111, Grant NSF-GI-30022
See also PB-242 086.

Descriptors: *Solar collectors, *Solar energy absorbers, *Optical coatings, Antireflection coatings, Silicon, Substrates, Molybdenum, Copper, Vapor deposited coatings, Thin films, Performance evaluation, Solar power generation, Solar energy concentrators, Absorption, Emittance.
Identifiers: Chemical vapor deposition.

Laboratory fabrication and measurement of solar absorbing coatings of high selectivity, (a/e), and their evaluation for use in electrical power production by means of thermodynamic cycles are discussed. Two types of selective coatings were evaluated: one using interference thin film stacks and the second using intrinsic optical absorption of CVD silicon.

20G. Particle Accelerators

AD-A011 425/6GA PC$3.75/MF$2.25
Naval Research Lab Washington D C
Report of Linac Research and Operations.
Interim rept. no. 15, 1 Jan-31 Dec 74.
May 75, 49p Rept no. NRL-MR-3049
See also report dated Apr 74, AD-778 313.

Descriptors: *Linear accelerators, Electron scattering, Radiation hardening, X rays, Plasmas(Physics), Laser beams, Nuclear fusion, Nuclear reactions.

The operation and use of the NRL 60-MeV electron Linac is described for the period 1 January-31 December 1974. Highlights of the basic and applied research programs are also reviewed. These programs include several projects in radiation vulnerability and hardening, radiation interactions via electron scattering and pulsed neutron studies, nuclear diagnostic programs for laser-fusion and exploding-wire plasmas, and other applications. The Linac was operated for 1875 hours during the period, including use by non-Branch projects. A bibliography is included as well as brief descriptions of Linac use by other groups.

COM-75-50351/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
SURF-II, A New Synchrotron Ultraviolet Radiation Facility at the NBS, (Extended Abstract).
Final rept.,
R. P. Madden, and D. L. Ederer. 1974, 3p
Pub. in Proceedings of International Conference on VUV Radiation Physics (4th), Hamburg, Germany, 17-26 Jul 74, n10.3 p774-776 1974.

Descriptors: *Synchrotrons, *Synchrotron radiation, Ultraviolet radiation.

At NBS the accelerator providing synchrotron radiation in the vacuum ultraviolet is being converted from a synchrotron to a storage ring which the authors anticipate will accelerate a 50mA electron beam to a maximum energy of 240 MeV. These changes will extend the useful spectral range of the continuum vacuum ultraviolet radiation down to wavelengths somewhat below 40A. Increased intensity, greater spacial and temporal stability are other advantages that this conversion will provide. Even at wavelengths greater than 200A the intensity is expected to increase by a factor of at least 100 to a value of 4 x 10 to the 11th power photons per sec per milliradian of orbit for an instrument resolution of delta lambda/lambda = 0.001. It should be of general interest that SURF-2 is being constructed so as to be compatible with a large user group.

20H. Particle Physics

AD-A011 191/4GA PC$3.25/MF$2.25
Cornell Univ Ithaca N Y
Fields and Radiation Due to a Charge Incident on a Conducting Plane.
Technical rept.,
Neal J. Maresca, and Richard L. Liboff. 11 May 73, 11p Rept no. JMP-116-75
Contract N00014-67-A-0077-0015
Availability: Pub. in Jnl. of Mathematical Physics, v16 n1 p116-124 Jan 75.

Descriptors: *Charged particles, Electromagnetic fields, Transitions, Particle trajectories, Bessel functions, Integral equations, Radiation attenuation, Energy levels, Reprints.

AD-A011 204/5GA PC$3.25/MF$2.25
Georgia State Univ Atlanta Dept of Physics
Effects of Minima in the Generalized Oscillator Strength on the Total Ionization Cross Section,
Steven T. Manson, and Alfred Msezane. 19 Nov 74, 4p ARO-11332.1-P
Grant DAHC04-74-G-0217
Availability: Pub. in Jnl. of Physics B: Atomic Molecular Physics, v8 n1 pl5-l7 1975.

Descriptors: *Charged particles, *Inelastic scattering, Ionization, Cross sections, Oscillators, Strength(General), Copper, Particle collisions, Reprints.

It is shown that an inflection in the total ionization cross section of an atomic subshell can occur if the generalized oscillator strength has a minimum. Results of calculations for the proton impact ionization of the 2s subshell of Cu showing this phenomenon are presented. (Author)

AD-A011 316/7GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Vertical Ionization Potentials of Radicals by the MINDO/3 method,
Michael J. S. Dewar, Herbert W. Kollmar, and Sung Ho Suck. 27 Aug 74, 4p AFOSR-TR-75-0769
Contract F44620-71-C-0119
Availability: Pub. in Theoretic Chimica Acta, v36 p237-239 1975.

Descriptors: *Ionization potentials, Vertical orientation, Estimates, Ionization, Alkyl radicals, Reprints.
Identifiers: MINDO/3 method.

Several methods are used to estimate the ionization potentials of radicals by the MINDO/3 procedure. The results are in quite good agreement with each other and with experiment. (Author)

AD-A011 334/0GA PC$3.25/MF$2.25
Columbia Radiation Lab New York
Measurement of the Hyperfine Structure of the 8 2P Orbitals 1/2 state of Rb87 and the 9 2P Orbitals 1/2 state of Cs133,
P. Tsekeris, J. Farley, and R. Gupta. 24 Feb 75, 2p
Contract DAAB07-74-C-0341
Availability: Pub. in Physical Review A, v11 n6 p2202-2203 Jun 75.

Descriptors: *Rubidium, *Cesium, *Hyperfine structure, *Molecular orbitals, Measurement, Excitation, Dye lasers, Magnetic dipoles, Reprints.

AD-A011 382/9GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
MINDO/3 Study of the Thermal Conversion of Cyclobutene to 1,3-Butadiene,
Michael J. S. Dewar, and Steven Kirschner. 5 Jul 74, 3p AFOSR-TR-75-0743
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the American Chemical Society, v96 p6809-6810 1974.

Descriptors: *Butadienes, *Cyclobutenes, Molecular orbitals, Chemical reactions, Heat, Conversion, Rotation, Reprints.
Identifiers: MINDO/3 molecular orbitals, MINDO molecular orbitals, Thermal conversion.

MINDO/3 calculations have been carried out for the conrotatory and disrotatory interconversion of cyclobutene and 1,3-butadiene. The calculated difference in activation energy 16.6 Kcal/mole which is in very good agreement with experimental results. The transition state for the disrotatory process is quite unsymmetrical having one methylene group rotated through 45 deg while the other has not rotated at all. (Author)

AD-A011 383/7GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Cryptochemiluminescence in the Rearrangements of Dewar Benzenes. The Requirements for Pericyclic Reactions to be Chemiluminescent,
Michael J. S. Dewar, Steven Kirschner, and Herbert W. Kollmar. 20 Jun 74, 4p AFOSR-TR-75-0745
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the American Chemical Society, v96 p7579-7581 1974.

Descriptors: *Benzene compounds, *Chemiluminescence, Molecular orbitals, Chemical reactions, Requirements, Electron transitions, Reprints.
Identifiers: MINDO/3 molecular orbitals, MINDO molecular orbitals, *Cryptochemiluminescence, Rearrangement reactions, Pericyclic reactions.

The triplet potential surface for the Dewar benzene-benzene system has been calculated by MINDO/3. The triplet and singlet surfaces intersect after the transition state for conversion of Dewar benzene to benzene is passed. These results are shown to account well for the formation of triplet excited benzene. (Author)

AD-A011 385/2GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
MINDO/3 Calculations of Molecular Electric Polarizabilities,
Michael J. S. Dewar, Robert C. Haddon, and Sung Ho Suck. 11 Feb 74, 4p AFOSR-TR-75-0742
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the Chemical Society Chemical Communications, p610-612 1974.

Descriptors: *Molecules, *Polarization, Perturbation theory, Computations, Molecular orbitals, Reprints.
Identifiers: MINDO Molecular Orbitals.

A formalism is developed for calculating molecular electric polarizabilities by the MINDO/3 semiempirical SCF MO method, using finite perturbation theory; the results for a number of molecules agree well with experiment. (Author)

AD-A011 469/4GA PC$3.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Application of Dynamic Background Subtraction to Quantification of Auger Electron and Soft X-Ray Appearance Potential Spectroscopies.
Journal article,
J. T. Grant, T. W. Haas, and J. E. Houston. 1974, 7p Rept no. ARL-75-0106
Presented at Proceedings of the International Conference on Solid Surfaces (2nd), Kyoto (Japan), 25-29 Mar 74.
Availability: Pub. in Japanese Jnl. of Applied Physics, Supplement 2, Part 2, p811-814 1974.

Descriptors: *Auger electron spectroscopy, *Soft x rays, *Surfaces, *Solids, Background, Backscattering, Integral equations, Differential equations, Reprints.
Identifiers: DBS(Dynamic Background Subtraction), Dynamic Background Subtraction, Multiple differentiation, Multiple integration, Modulation amplitude.

Dynamic Background Subtraction (DBS) involves multiple differentiation followed by multiple integration of some experimental variable. The technique is applied to Auger electron and soft X-ray appearance potential spectroscopies to remove large background signals allowing one to make meaningful quantitative comparisons from such data. It is found that double differentiation of electron current distributions followed by double integration is sufficient to remove backgrounds in these studies. (Author)

AD-A011 470/2GA PC$3.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
The Absolute Positions of Calculated Energy Bands.
Journal article,
R. N. Euwema, and G. T. Surratt. 22 Mar 74, 7p
Rept no. ARL-75-0119
Availability: Pub. in Jnl. of Physics and Chemistry of Solids, v36 p67-71 1975.

Descriptors: *Energy bands, Position(Location), Crystals, Electrostatics, Electric charge, Computations, Hartree-fock approximation, Reprints.
Identifiers: Ewald limit, Charge clusters.

The absolute positions of calculated crystalline energy bands depend upon the choice of charge cluster used to generate the total crystalline charge for the coulomb potential calculation. The coulomb potential (and hence the bands) will be shifted from the Ewald limit by 2pi times the trace of the second moment tensor of the charge cluster divided by three times the volume of the unit cell. Energy bands obtained from different calculations models can thus all be corrected to the same Ewald limit. Energy bands can also be aligned more realistically with those in a finite crystal by calculating the shift in the bands from the Ewald limit due to a free atom or ion surface charge density. (Author)

AD-A011 474/4GA PC$3.25/MF$2.25
Dayton Univ Ohio
Super 48 Ti(Super 3 He, t) Super 48 V Reaction,
Journal article,
J. C. Manthuruthil, C. P. Poirier, and L. Meyer-Schuetzmeister. 21 Oct 74, 13p ARL-75-0140
Contract F33615-71-C-1877
Availability: Pub. in Physical Review C, v11 n4 p1141-1151 Apr 75.

Descriptors: *Nuclear reactions, *Odd odd nuclei, *Titanium, *Helium, *Isotopes, Nuclear shell models, Magnetic fields, Nuclear radiation spectroscopy, Nuclear spins, Nuclear energy levels, Parity, Nuclear cross sections, Protons, Tritons, Excitation, Angles, Distribution.
Identifiers: *Distorted wave theory, *Distorted wave-born excitation, Angular distributions, Parity states, Nuclear spectroscopy, DWBA(Distorted wave-born approximation), Hole states.

AD-A011 516/2GA PC$3.25/MF$2.25
Pennsylvania State Univ University Park Dept of Physics
Tunneling Theory without the Transfer-Hamiltonian Formalism. I,
T. E. Feuchtwang. 28 Aug 72, 16p AFOSR-TR-75-0723
Grant AF-AFOSR-1727-69
Availability: Pub. in Physical Review B, v10 n10 p4121-4134, 15 Nov 74.

Descriptors: *Hamiltonian, *Charged particles, Coupling(Interaction), Transfer functions, Green's function, Perturbation theory, Energy transfer, Tunneling, Reprints.

Tunneling between two semi-infinite systems across and abrupt junction (of zero thickness) is discussed without invoking the transfer-Hamiltonian formalism. A lucid and novel interpretation of the significance of the transfer Hamiltonian is obtained. A rigorous and easily applied separation of the junction into its two component subsystems is introduced. The current is expressed in terms of characteristics of these two subsystems. Keldysh's perturbation theory for nonequilibrium processes is used to include the effects of the external potential V to all orders. The new formulation of tunneling manifestly applies in the zero-thickness extreme-strong-coupling limit, where the current formulation of the transfer Hamiltonian fails. The extension of the formalism to junctions of finite width has been worked out and is reported in a second paper, in which it is demonstrated that the results for the abrupt junction follow from those of the finite junction in the zero-width limit, and agree with them qualitatively. The formalism is specifically suited to include many-body interactions.

AD-A011 530/3GA PC$3.25/MF$2.25
Vanderbilt Univ Nashville Tenn Dept of Chemistry
Electronic Structures of Phosphorus Pentafluoride and Tetrafluorophosphorane,
James M. Howell, John R. Van Wazer, and Angelo R. Rossi. 18 Oct 73, 7p AFOSR-TR-75-0691
Grant AF-AFOSR-2265-72
Availability: Pub. in Inorganic Chemistry, v13 n7 p1747-1752 1974.

Descriptors: *Phosphorus compounds, *Fluorine compounds, *Molecular orbitals, Wave functions, Electron density, Computerized simulation, Reprints.
Identifiers: Phosphorus pentafluoride, Phosphorane/Tetrafluoro.

Ab initio LCAO-MO-SCF calculations were carried out on the PF5 and PF4H molecules, employing moderately small gaussian basis sets. Using the resulting wave functions, it was found that the molecular orbitals of these two molecules are readily interrelated with respect to their detailed electron density distributions. A further such interrelationship was carried out between the molecular orbitals of PF5 and those of the PF3 and OPF3 molecules. (Author)

AD-A011 531/1GA PC$3.25/MF$2.25
Vanderbilt Univ Nashville Tenn Dept of Chemistry
An 'ab Initio' Study of the Role of d Orbitals in Chlorosilane,
James M. Howell. 6 Nov 73, 9p AFOSR-TR-75-0684
Grant AF-AFOSR-2265-72
Availability: Pub. in Jnl. of the American Chemical Society, v96 n10 p3064-3070, 15 May 74.

Descriptors: *Silanes, *Chlorides, *Molecular orbitals, *Chemical bonds, Computerized simulation, Electron density, Reprints.

Ab initio LCAO-MO-SCF computations of the wave function of chlorosilane have been carried out in a moderately sized, uncontracted, Gaussian basis set with and without an appropriate manifold of d orbitals being allowed to the silicon and/or the chlorine atom. Electron-density difference plots show that conferring d character upon either the silicon or the chlorine has about the same effect on the detailed transfer of charge between the chlorine and silicon atoms, although the usual interpretation in terms of the contributing atomic orbitals leads to the conclusion that, when d character is allowed only to the silicon, there is a transfer of charge from the chlorine but, when it is allowed only to the chlorine, the effect is essentially just a polarization of this atom. The calculated variations in the orbital energies of the core electrons upon allowing or disallowing d character to the silicon or chlorine atoms are interpreted in terms of changes in the electrostatic potential in the core region. (Author)

AD-A011 622/8GA PC$3.25/MF$2.25
Chicago Univ Ill Dept of Chemistry
Velocity Dependence of Absolute Total Cross Sections for LiF Scattered by Nonpolar Targets,
P. M. Dehmer, and L. Wharton. 2 Jul 74, 7p
AFOSR-TR-75-0841
Grants AF-AFOSR-2176-72, AF-AFOSR-1838-70
Availability: Pub. in Jnl. of Chemical Physics, v61 n10 p4204-4208, 15 Nov 74.

Descriptors: *Scattering cross sections, *Lithium fluorides, Deuterium, Methane, Helium, Neon, Xenon, Inelastic scattering, Elastic scattering, Reprints.

Total cross sections accurate to 1-2 percent were measured in the thermal energy range for LiF scattered by rare gas atoms (He, Ne, Xe) and nonpolar molecules (D2, CH4). In all cases, the cross sections were pressure independent, indicating that (1) the scattering was not a discernable function of the internal state of the primary beam molecule, and (2) the degree of inelasticity occurring at the outermost impact parameter regions probed was small. This allowed the observed velocity dependence of the cross sections to be interpreted in terms of spherically averaged monotonic potentials except in the cases of LiF-He, LiF-Ne, and LiF-D2 where the repulsive and well regions are probed. For every system the slope d1nQ/d1nv of the cross section deviated from the theoretical slope of -0.4 predicted for a pure van der Waals 1/r to the 6th power interaction, suggesting the presence of higher order forces. As the size of the impact parameters explored increased, as increasingly large scattering targets were used, the slopes approached -0.4. For systems which sampled attractive regions of the inter-molecular potential, cross sections which were calculated from the Schiff-Landau-Lifschitz(SLL) relation using the induction energy and the Slater-Kirkwood dispersion energy were 6-8 percent smaller than the corresponding experimental cross sections. For LiF-Xe, the system which most closely approached pure van der Waals behavior (with a slope of -0.389), the calculated cross section was 8 percent smaller than experiment. The absence of glory oscillations in the cross sections, provided an estimate of the lower limit for opacity at the glory impact parameter.

AD-A011 625/1GA PC$3.25/MF$2.25
Chicago Univ Ill James Franck Inst
High Resolution Differential Cross Sections and Intermolecular Potentials. I. Li-Kr and Li-Xe,
D. J. Auerbach. 21 Jan 74, 6p AFOSR-TR-75-0842
Grant AF-AFOSR-2176-72
Availability: Pub. in Jnl. of Chemical Physics, v60 n11 p4116-4122, 1 Jun 74.

Descriptors: *Lithium, *Krypton, *Xenon, *Differential cross sections, High frequency, Oscillation, Reprints.

AD-A011 634/3GA PC$3.25/MF$2.25
Columbia Univ New York Dept of Chemistry
Lifetime-Separated Spectroscopy: Observation and Rotational Analysis of the BaO A State,
J. Gary Pruett, and Richard N. Zare. 7 Nov 74, 13p AFOSR-TR-75-0818

Contract N00014-67-A-0108-0038, Grant AF-AFOSR-2551-73
Availability: Pub. in Jnl. of Chemical Physics, v62 n6 p2050-2059, 15 Mar 75.

Descriptors: *Barium oxides, *Fluorescence, *Electron transitions, *Electronic states, Chemical lasers, Life span, Separation, Band spectra, Reprints.
Identifiers: Lifetime-separated spectroscopy.

The BaO A' 1 pi - X 1 sigma (+) band system has been investigated using laser-induced fluorescence. The BaO is formed in the gas-phase reaction Ba+CO2 under single-collision conditions, and the A' 1 pi and A 1 sigma (+) states are simultaneously excited by a pulse tunable dye laser with a 0.2 A bandwidth.

COM-75-50365/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Measurement of Absolute Fission Rates.
Final rept.,
J. A. Grundl, D. M. Gilliam, N. D. Dudey, and R. J. Popek. Feb 75, 21p
Pub. in Nuclear Technology, v25 p237-257 Feb 75.

Descriptors: *Nuclear fission, *Plutonium 239, *Uranium 235, *Neptunium isotopes, Rates(Per time).
Identifiers: Reprints, *Uranium 234, *Uranium 238, *Neptunium 237.

The capability to measure absolute fission rates per nucleus at a remote laboratory site (the Coupled Fast Reactivity Measurement Facility (CFRMF) at Aerojet Nuclear Company) has been established to a precision level of better than plus or minus and was sustained at that level for a period of two years. The array of reference and working fissionable deposits involved in the measurements included five isotopes: 239Pu, 235U, 238U, 237Np, and 234U.

COM-75-50367/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Giant Multipole Resonances and the Three-Fluid Hydrodynamical Model of Nuclei.
Final rept.,
L. C. Biedenharn, M. Trivedi, and Michael Danos. Apr 75, 3p
Pub. in Physical Review C, v11 n4 p1482-1484 Apr 75.

Descriptors: *Nuclear magnetic resonance, *Lead isotopes.
Identifiers: Reprints, *Lead 208.

The recently observed resonance at about 11 MeV in 208Pb is interpreted as the miniature quadrupole resonance (associated with the giant quadrupole resonance at 22 MeV) implied by the three-fluid hydrodynamical model. A difficulty arises with the miniature dipole resonance; this may signify that the simple hydrodynamic model has reached the limits of its validity. A numerical error in a previous publication is corrected.

N75-23252/0GA PC$3.75/MF$2.25
Pisa Univ. (Italy).
The Detection of Neutrons by the Reaction (N, alpha) on B10 la Rivelazione Dei Neutroni Mediante la Reazione (N, alpha) Sul B10.
G. Curzio. 1974, 32p RP-176(74)
Language in Italian.

Descriptors: *Boron 10, *Neutron counters, *Nuclear reactions, Ionization chambers, Proportional counters, Scintillation counters.

For abstract, see STAR 1314

20I. Plasma Physics

AD-A011 124/5GA PC$3.25/MF$2.25
Naval Research Lab Washington D C
Ion Heating by Expansion of Beam-Heated Plasma.
Memorandum rept.,
K. R. Chu, Robert W. Clark, Martin Lampe, Paulette C. Liewer, and Wallace M. Manheimer. Apr 75, 14p Rept no. NRL-MR-3044

Descriptors: *Plasma oscillations, Electron beams, Laser beams, Instability, Damping.
Identifiers: *Plasma heating.

A column of plasma, whose electrons are rapidly heated by an electron beam or laser, will expand against the external magnetic field, setting up large-amplitude magnetosonic oscillations. The authors study the dissipation of these oscillations by anomalous resistance, ion Landau damping, and ion counterstreaming, and show that much of the initial (T sub e) can be converted into (T sub i).

AD-A011 127/8GA PC$3.25/MF$2.25
Office of Naval Research London (England)
International Congress on Waves and Instabilities in Plasmas (2nd), Held in Innsbruck, Austria, in March 1975.
Conference rept.,
Martin S. Harris. 14 May 75, 12p Rept no. ONRL-C-10-75

Descriptors: *Plasmas(Physics), *Meetings, Plasma oscillations, Magnetic pinch, Heating, Instability, Austria.
Identifiers: Plasma diagnostics, Tokamaks.

The congress was hosted by the University of Innsbruck. It brought together about 200 scientists from 25 countries. Papers and discussions include the theory of coherent wave-wave interaction, experiments in quiescent plasmas, wave theory, applications to natural plasmas, plasma heating, electron plasma waves and sideband instabilities, beam-plasma interaction, fluctuations and turbulence, collisional effects, pinches and Tokamaks, diagnostics, and ion waves.

AD-A011 331/6GA PC$3.25/MF$2.25
Air War Coll Maxwell AFB Ala
Establishment of Quasi-Steady Conditions in a Blow-Down Nonequilibrium MHD Generator,
J. J. Rosciszewski, and T. T. Yeh. 16 Aug 73, 5p
AFOSR-TR-75-0862
Contract F44620-69-C-0109
Availability: Pub. in AIAA Jnl. v12 n8 p1021-1024 Aug 74.

Descriptors: *Magnetohydrodynamic generators, *Plasmas(Physics), Time, Steady state, Nonequilibrium flow, Shock tubes, Argon, Cesium, Reprints.

In the present paper, numerical calculations of a nonsteady nonequilibrium flow in a divergent linear MHD generator section are presented. The objective of this work was to find time necessary for the establishment of a steady-state condition at different generator loads and reservoir parameters. The working gas was argon, seeded with 1% of cesium. Results indicate that, as a general rule, the time needed to establish quasi-steady conditions is of the order of 2-3 msec, and if a secondary shock wave appears early, it remains also later at quasi-steady conditions.

AD-A011 332/4GA PC$3.25/MF$2.25
Columbia Univ New York Plasma Research Lab
Magnetic Field Annihilation in a Reversed-Field Current Layer,
Y. G. Chen, R. M. Chervin, S. Robertson, and R. T. Taussig. 17 May 74, 6p AFOSR-TR-75-0727
Contract F44620-71-C-0010
Availability: Pub. in The Physics of Fluids, v17 n11 p2014-2018 Nov 74.

Descriptors: *Plasmas(Physics), *Magnetic fields, Diffusion, Magnetohydrodynamics, Equations, Pinch effect, Reprints.

Reversed-field current layer evolution with magnetic field annihilation is examined numerically using single-fluid, two-temperature, magnetohydrodynamic equations with anisotropic, classical transport properties. Self-pinching occurs with magnetic field reversal in the current layer. Very high local plasma temperatures and density are produced in the pinched current layer and magnetic field diffusion is inhibited. Numerical results are compared with experimental data. (Author)

AD-A011 432/2GA PC$3.25/MF$2.25
Naval Research Lab Washington D C
An Interpretation of Soliton Formation and Parametric Instabilities.
Interim rept.,
W. M. Manheimer, and K. Papadopoulos. May 75, 8p Rept no. NRL-MR-3063

Descriptors: *Plasmas(Physics), Electron beams, Laser beams, Plasma oscillations, Instability.
Identifiers: *Plasma heating, *Parametric instabilities, *Solitons.

It is shown that soliton formation and the resulting plasma heating are nothing more than the description in configuration space of well-known parametric processes and quasilinear theory.

AD-A011 491/8GA PC$4.25/MF$2.25
Naval Research Lab Washington D C
Bound-Bound Radiation/Collisional-Radiative Recombination in Oxygen and Nitrogen Plasmas.
Final rept. 1 Jan-31 Dec 74,
Larry A. Jones. 13 Feb 75, 54p DNA-3565F
DARPA Order-1433
See also report dated 24 Sep 73, AD-770 195.

Descriptors: *Plasmas(Physics), Experimental design, Atomic energy levels, Energy transfer, Electron density, Temperature, Excitation, Recombination reactions, Magnetic pinch, Density, Electron transitions, Electron energy.
Identifiers: *Oxygen plasma, *Nitrogen plasma, *Plasma diagnostics.

Number densities of several excited states of atomic oxygen and nitrogen have been measured in the decaying non-thermal plasma of a theta-pinch afterglow. The spatial variation of the electron density and temperature as a function of time after the initiation of main bank discharge have also been measured to facilitate a comparison of excited state number densities with model calculations. Measurements of the atomic oxygen excited states indicate that quintet to triplet spin exchange collisions and doubly excited states must be included in the model. The measured populations of the excited atomic nitrogen states agree well with those calculated at high density but disagree badly at lower densities. The discrepancies seem to be real since they are larger than expected measurement uncertainty.

AD-A011 514/7GA PC$3.25/MF$2.25
California Univ Berkeley Electronics Research Lab
Plasma Confinement in Multiple-Mirror Systems. I. Theory,
A. Makhijani, A. J. Lichtenberg, M. A. Lieberman, and B. Grant Logan. 29 Jun 73, 13p
AFOSR-TR-75-0780
Grant AF-AFOSR-1754-69
See also AD-A011 515.
Availability: Pub. in The Physics of Fluids, v17 n6 p1291-1301 Jun 74.

Descriptors: *Plasma sheaths, *Magnetohydrodynamics, *Mirrors, *Nuclear fusion, *Plasma devices, Magnetic fields, Variations, Inequalities, Numerical analysis, Confinement(Nuclear reactors), Nuclear scattering, Electron transport, Ions, Scaling factors, Diffusion theory, Nuclear reactors, Drift.
Identifiers: Ion-ion collisions.

Interest has developed in multiple-mirror confinement systems as possible fusion reactors. Numerical calculations of particle containment in multiple-mirror systems have been performed using fixed scattering centers.

AD-A011 515/4GA PC$3.25/MF$2.25
California Univ Berkeley Electronics Research Lab
Plasma Confinement in Multiple Mirror Systems. II. Experiment and Reactor Calculation,
B. Grant Logan, I. G. Brown, A. J. Lichtenberg, and M. A. Lieberman. 29 Jun 73, 14p AFOSR-TR-75-0781
Grant AF-AFOSR-1754-69
See also AD-A011 514.
Availability: Pub. in The Physics of Fluids, v17 n6 p1302-1313 Jun 74.

Descriptors: *Plasma sheaths, *Magnetohydrodynamics, *Mirrors, *Nuclear fusion, *Plasma devices, Nuclear reactors, Magnetic fields, Diffusion theory, Numerical analysis, Confinement(Nuclear reactors), Variations, Ions, Langmuir probes, Collecting methods, Electron transport, Scaling factors.
Identifiers: Ion-ion collisions, Random walk process.

A multiple mirror experiment confirms the predictions of the theory that the axial confinement time exceeds that of a single mirror of the same length, and that the confinement scales as L(2), where L is the system length. The experiment indicates that the improved confinement occurs in an intermediate mean free path regime in which the mean free path for scattering out of loss cone is of the order of a cell length. The absolute value of the axial confinement is smaller than the optimum confinement predicted from the theory by a factor between two and three, which is accounted for by the deviation of experimental parameters from optimum conditions. The scaling of the confinement time with mirror ratio is also investigated.

AD-A011 629/3GA PC$3.25/MF$2.25
California Univ Los Angeles Dept of Physics
Development of 'Cavitons' and Trapping of rf Field,
H. C. Kim, R. L. Stenzel, and A. Y. Wong. 18 Mar 74, 5p AFOSR-TR-75-0861
Grant AF-AFOSR-2332-72
Availability: Pub. in Jnl. Physical Review Letters, v33 n15 p886-889, 7 Oct 74.

Descriptors: *Plasmas(Physics), *Parametric analysis, Instability, Radiofrequency, Nonlinear systems, Wave propagation, Electron beams, Diagnosis(General), Electric fields, Resonance, Trapping(Charged particles), Density, Growth(General), Optical pumping, Perturbations, Electric discharges, Reprints.
Identifiers: *Parametric instability, *Ponderomotive force, *Wave trapping.

A new kind of parametric instability is observed in a nonuniform plasma in which a resonant rf electric field and a density cavity grow simultaneously through mutual enhancements. The threshold is observed to be virtually zero and the growth rate is linearly dependent on pump intensity. Ponderomotive force and wave trapping are observed to be the mechanisms which drive the instability.

N75-23289/2GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Drift-Free Magnetic Geometries in Adiabatic.
D. P. Stern, and P. Palmadesso. Apr 75, 25p
NASA-TM-X-70884, X-602-75-105
Misc-Supersedes X-602-75-15. Subm-Submitted for Publication.

Descriptors: *Adiabatic conditions, *Charged particles, *Magnetic fields, *Particle motion, Drift, Drift rate, Hamiltonian functions, Magnetic mirrors, Mirror point, Plasma physics.

For abstract, see STAR 1314

20J. Quantum Theory

AD-A011 306/8GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
MINDO/3 Study of the Bisdehydrobenzenes,
Michael J. S. Dewar, and Wai-Kee Li. 21 Feb 74, 5p AFOSR-TR-75-0776
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the American Chemical Society, v96 n17 p5569-5571, 21 Aug 74.

Descriptors: *Benzene compounds, *Quantum chemistry, Molecular structure, Molecular isomerism, Geometry, Excitation, Polycyclic compounds, Molecular orbitals, Reprints.
Identifiers: Bisdehydrobenzenes, Hexatrienes, MINDO/3.

MINDO/3 calculations are reported for singlet and triplet states of the three dehydrobenzenes (benzynes). All three are predicted to have singlet ground states but the singlet-triplet separation decreases, and the biradical character of the singlet increases, in the order o<m<p. The calculated geometries indicate bonding interactions between the 'radical' centers in the m and p isomers. Bicyclo(2,2,0)hexatriene is predicted to be a stable species, isomeric with p-benzyne. (Author)

AD-A011 307/6GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
MINDO/3 Study of the Thermolysis of Dioxetane. Role of the Triplet State,
Michael J. S. Dewar, and Steven Kirschner. 20 Jun 74, 4p AFOSR-TR-75-0770
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the American Chemical Society, v96 n24 p7578-7579, 27 Nov 74.

Descriptors: *Oxetanes, *Formaldehyde, *Quantum chemistry, Pyrolysis, Heat of activation, Molecular orbitals, Reprints.
Identifiers: *Dioxetane, MINDO/3.

MINDO/3 calculations indicate that the thermolysis of dioxetane to formaldehyde proceeds neither by retro (2 + 2) cycloaddition nor by fission of the O-O bond to an intermediate biradical but by direct intersystem crossing to the triplet potential surface, the singlet-triplet crossing point being the transition state. This accounts for the apparently exclusive formation of triplet excited products by thermolysis of dioxetanes. MINDO/3 gives good estimates of the energies of the lowest singlet and triplet states of formaldehyde. (Author)

AD-A011 308/4GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Nature of the Transition States in 'Forbidden' Electrocyclic Reactions,
Michael J. S. Dewar, and Steven Kirschner. 1 Dec 73, 4p AFOSR-TR-75-0774
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the American Chemical Society, v96 p5244-5246 1974.

Descriptors: *Transitions, *Reaction kinetics, Ions, Cyclopropanes, Cyclobutenes, Molecular orbitals, Reprints.
Identifiers: Forbidden electrocyclic reactions, MINDO-3.

The results of extensive MINDO/3 studies of 'forbidden' pericyclic reactions are summarized. Whenever possible, the reaction takes place in an unsymmetrical fashion, the transition state preceding the intermediate biradical. These results invalidate all previous calculations on such reactions. (Author)

AD-A011 631/9GA PC$3.25/MF$2.25
California Univ Davis Dept of Physics
A Pseudopotential Calculation of the Electronic Structure of Platinum,
D. L. Rogers. 1 Oct 74, 6p AFOSR-TR-75-0698
Grant AF-AFOSR-2353-72
Availability: Pub. in Physica Status Solidi (b), 66 pK53-K57 1974.

Descriptors: *Platinum, *Band theory of solids, Electronic states, Energy bands, Density, Photoelectric emission, Reprints.
Identifiers: Empirical pseudopotential method.

This paper reports a non-relativistic band structure calculation for platinum using the empirical pseudopotential method (EMP) and compares the resultant density of states with the uv photoemission experiments of Lin. (Author)

AD-A011 639/2GA PC$3.25/MF$2.25
Rochester Univ N Y Dept of Physics and Astronomy
Alternatives to Quantum Electrodynamics: Status of the Controversy,
L. Mandel. 1974, 3p AFOSR-TR-75-0725
Grant AF-AFOSR-2593-74
Availability: Pub. in IEEE Jnl. of Quantum Electronics, vQE-10 n9 p773-774 Sep 74.

Descriptors: *Quantum electrodynamics, Radiation, Photons, Theory, Reviews, Reprints.

A number of theoretical alternatives to quantum electrodynamics have been proposed and debated during the last few years. The relevant experimental evidence, some possible new tests and the current status of the controversy will be reviewed. (Author)

N75-22565/6GA PC$3.25/MF$2.25
Loughborough Univ. of Technology (England). Dept. of Mathematics.
On the Superposition of Electromagnetic Waves in General Relativity.
J. B. Griffiths. Aug 74, 13p MATHS-RES-46

Descriptors: *Field theory (Physics), *Nonlinearity, *Relativity, *Superposition (Mathematics), *Wave propagation, Congruences, Electromagnetic fields, Electromagnetic interactions, Electromagnetic radiation, Maxwell equation, Null zones.

For abstract, see STAR 1314

N75-22974/0GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Gravitational Clock: A Proposed Experiment for the Measurement of the Gravitational Constant G.
L. L. Smalley. 23 Jan 75, 36p NASA-TM-X-64920

Descriptors: *Gravitational constant, *Mechanical oscillators, *Satellite drag, *Satellite-borne instruments, Equipment specifications, Flat plates, Superconductors, Thin films.

For abstract, see STAR 1314

20K. Solid Mechanics

AD-A011 126/0GA PC$6.25/MF$2.25
Naval Ship Research and Development Center Bethesda Md
Programmer's Manual Additions and Demonstration Problems for a Thermostructural Capability for NASTRAN Using Isoparametric Finite Elements,
Myles M. Hurwitz. Mar 75, 155p Rept no. NSRDC-4656
See also report dated May 73, AD-769 464.

Descriptors: *Stresses, *Computer programming, Finite element analysis, Thermodynamics, Convection(Heat transfer), Computations.
Identifiers: *NASTRAN computer program, *Structural analysis, CDC 6000 computers, UNIVAC 1108 computers, *Stress analysis.

This report describes programmer's information for a thermostructural capability using isoparametric elements which was developed for the NASTRAN structural analysis computer program. Some hints for using isoparametric elements and some demonstration problems are also included.

AD-A011 154/2GA PC$3.25/MF$2.25
California Univ San Diego La Jolla Dept of Applied Mechanics and Engineering Sciences
On Transverse Bending of Plates, Including the Effect of Transverse Shear Deformation,
E. Reissner. 8 Jul 74, 6p
Contract N00014-69-A-0200-6027
Availability: Pub. in International Jnl. of Solids Structure, v11 n5-D p569-573 1974.

Descriptors: *Plates, *Bending, Shear stresses, Deformation, Two dimensional, Three dimensional, Holes(Openings), Reprints.

In this paper, the problem of transverse bending of homogeneous transversely isotropic plates, including the effect of transverse shear deformation is discussed. An approach to the problem which reproduces earlier equations of two-dimensional plate theory is described while at the same time new supplementary information concerning certain practically important three-dimensional aspects of the problems is presented. The significance of this supplementary information will be shown for the example of the problem of pure bending of an infinite plate with a circular hole.

AD-A011 193/0GA PC$3.25/MF$2.25
California Univ San Diego La Jolla
Note on the Equations of Finite-Strain Force and Moment Stress Elasticity,
E. Reissner. 16 Oct 74, 8p
Contract N00014-69-A-0200-6027
Availability: Pub. in Studies in Applied Mathematics, v54 n1 p1-8 Mar 75.

Descriptors: *Stresses, *Stress strain relations, Vector analysis, Elastic properties, Two dimensional, Bending moments, Equations, Applied mechanics, Reprints.

Given a system of vectorial equilibrium equations for force and moment stress in a finitely deforming medium, we derive a system of force and moment strain-displacement relations, consistent with the former via application of the principle of virtual work. We then obtain a system of vectorial compatibility equations, and we establish a connection between the present description of force stresses and strains, for the limiting case of absent moment stresses, with the classical description involving Kirchhoff stresses and Green strains, including the statement of constitutive equations corresponding to a given set of such equations for the measures of Kirchhoff and Green.

AD-A011 255/7GA PC$3.25/MF$2.25
Army Materials and Mechanics Research Center Watertown Mass
Stresses Around Central Holes in a Stiffened Orthotropic Strip,
Chatta Lakshmikantham. Apr 75, 11p Rept no. AMMRC-TR-75-8

Descriptors: *Panels, *Holes(Openings), *Stresses, *Fiber reinforced composites, Stiffness, Complex variables, Boundary value problems.
Identifiers: Stress analysis.

This paper deals with the stress analysis of orthotropic panels with edge stiffeners and central holes, elliptical or circular in cross section. Stress profiles are obtained for fixed hole geometry as functions of stiffener geometry. Stress variations are also computed as functions of hole size for different stiffening geometries.

AD-A011 256/5GA PC$3.25/MF$2.25
Army Materials and Mechanics Research Center Watertown Mass
Stresses Around Holes in Stiffened Composite Panels Using Laurent-Series and Finite Element Methods.
Chatta Lakshmikantham, and Pin Tong. Apr 75, 12p Rept no. AMMRC-TR-75-7
Presented at the Proceedings of the International Conference (5th) on Experimental Stress Analysis, Udine, Italy, 1974. Summary in French and German.

Descriptors: *Panels, *Holes(Openings), *Stresses, *Fiber reinforced composites, Finite element analysis, Boundary value problems, Crack propagation, Computations, Power series.
Identifiers: Laurent series.

This paper deals with an analytical determination of the stress field around a symmetrically placed hole whose shape is one of a circle or an ellipse. The hole is in an orthotropic panel (strip) whose edges are reinforced with stiffeners of similar orthotropic material. The panel is subjected to tension at the remote ends. The stresses have been calculated using both a Laurent-series expansion in complex potentials and a finite-element approach using a simple quadrilateral element. The accuracy of the finite element approach was checked against the Laurent-series method and was found to be extremely satisfactory for obtaining profiles of stress variation from the vicinity of the hole to the stiffener edge. Curves showing the influence of the edge stiffening on the stresses are shown for a variety of parameters.

AD-A011 300/1GA PC$3.25/MF$2.25
Army Materials and Mechanics Research Center Watertown Mass
On the Dynamic Buckling of Shells of Revolution,
Pin Tong, and Jiro Adachi. 5 Oct 73, 6p Rept no. AMMRC-TR-75-9
Availability: Pub. in AIAA Jnl., v12 n6 p863-865 Jun 74.

Descriptors: *Bodies of Revolution, *Buckling, Shells(Structural forms), Finite element analysis, Stability, Loads(Forces), Impulse loading, Experimental data, Comparison, Reprints.

Test results of earlier static pressure and pulsed pressure buckling experiments on shallow spherical caps are examined analytically. Imperfection amplitudes are estimated from the static buckling results. The prebuckling deformation and the bifurcation buckling mode are determined by finite element analysis for the series of spherical caps tested. The present analysis generally gives a lower bound on the experimental data. (Author)

AD-A011 357/1GA PC$4.25/MF$2.25
Lehigh Univ Bethlehem Pa Inst of Fracture and Solid Mechanics
Three-Dimensional Stress Analysis of a Finite Slab Containing a Transverse Central Crack.
Technical rept.,
G. C. Sih , P. D. Hilton, R. J. Hartranft, and B. V. Kiefer. Jun 75, 62p Rept no. IFSM-75-69
Contract N00014-67-A-0370-0012

Descriptors: *Metal plates, *Crack propagation, Strain(Mechanics), Stresses, Finite element analysis, Cracks.

Finite element procedures are used to solve two- and three-dimensional problems of cracks in elastic bodies. The two-dimensional, plane strain analysis is concerned with the effect of a crack approaching a free edge at right angles. The strain energy density fracture criterion is used to determine the direction of fracture for various distances from the crack tip to thr free edge. These results provide a possible mechanism for the creation of the shear lip region in a plate of finite thickness. The three-dimensional isoparametric finite element procedure is specialized for application to crack problems by the introduction of elements which model the crack edge singularity. The finite element approach is used to study the problem of a through crack in a finite thickness plate subject to symmetric loading. Variations of the stress intensity factor, near field stress components, and strain energy density through the plate thickness are reported.

AD-A011 374/6GA PC$4.75/MF$2.25
Catholic Univ of America Washington D C Inst of Ocean Science and Engineering
Characterization and Analysis of Particles Produced by Cavitation Erosion.
Technical rept.,
Deepak Kenkeremath, and A. Thiruvengadam. May 75, 77p
Contract N00014-67-A-0377-0008

Descriptors: *Erosion, Cavitation, Particles, Steel, Aluminum alloys, Photomicrography, Particle size, Shape.
Identifiers: Steel 52100, Aluminum alloy 1100.

The long range objectives of the investigation are (1) to identify the size and shape of the eroded particle, (2) analyze the mechanisms that produce these particles, and (3) to develop methods through which the erosion phenomena may be identified and prevented. Using the ASTM standard vibratory equipment, cavitation erosion tests were conducted on annealed SAE 52100 bearing steel and aluminum 1100-F in SAE 10W non-detergent lubricating oil and distilled water in addition to some preliminary other material fluid combinations. Specialized techniques for isolating and mounting the eroded particles were developed. The analysis of these particles was conducted by use of a specially built bichromatic light microscope, an electron probe micro-analyzer, and a scanning electron microscope.

AD-A011 380/3GA PC$3.25/MF$2.25
Washington State Univ Pullman Dept of Physics
Dislocation Mechanisms for Stress Relaxation in Shocked LiF,
Y. M. Gupta, G. E. Duvall , and G. R. Fowles. 30 Aug 74, 17p AFOSR-TR-75-0700
Contract F44620-67-C-0087, Grant NSF-GH-34650
Availability: Pub. in Jnl. of Applied Physics, v46 n2 p532-546 Feb 75.

Descriptors: *Lithium compounds, *Fluorides, *Dislocations, Single crystals, Shock waves, Wave propagation, Stress relaxation, Elastic waves, Magnesium, Impurities, Heat treatment, Reprints.

A study of shock wave propagation along the <100> direction in LiF single crystals is presented. Plate impact experiments were conducted to produce elastic impact stresses of approximately 29 kbar. Stress time profiles at the impact surface and rear surface for thicknesses up to 3.2 mm were observed. Experiments were done for two impurity concentrations and three different heat treatments. Material characterization to supplement the shock data was provided by quasistatic yield stress measurements, dielectric relaxation data, initial dislocation density counts, and spectrographic analysis. Elastic wave attenuation is strongly influenced by both Mg(++) impurities and heat treatments. (Author)

AD-A011 487/6GA PC$4.25/MF$2.25
Technion - Israel Inst of Tech Haifa Dept of Aeronautical Engineering
Stability, Behaviour and Vibrations of an Annular Plate under Uniform Compression.
Oct 74, 68p Rept no. TAE-229

Descriptors: *Plates, *Loads(Forces), Bending, Buckling, Deflection, Vibration, Strain(Mechanics), Israel.

The behavior of an annular plate, free at its inner edge and simply supported at the outer one is investigated experimentally. The loading is a compressive inplane force which is uniformly applied at the outer boundary. Deformations, strains frequencies and mode shapes are explored over sub, trans and post buckling regions. Experimental results for the buckling loads, obtained by different methods are compared, and comparison is also made with existing theoretical data. An approximate formula for the vibrations of the loaded annular plates is developed and compared with the experimental results.

N75-22808/0GA PC$4.25/MF$2.25
Pisa Univ. (Italy). Ist. di Meccanica Applicata e Costruzioni di Macchine.
A Method for Determining the Frequency and Proper Mode of Vibration Transverse a Reticle Plane UN Metodo Per la Determinazione Delle Frequenze E Dei Modi Propri di Vibrazione Trasversali di Travature Reticolari Piane.
G. Cavallini. 1972, 52p REPT-34
Language in Italian.

Descriptors: *Beams (Supports), *Structural analysis, *Vibration mode, Elastic deformation, Graphs (Charts), Mathematical models, Tables (Data), Transverse waves.

For abstract, see STAR 1314

N75-22809/8GA PC$3.75/MF$2.25
Pisa Univ. (Italy). Ist. di Meccanica Applicata e Costruzioni di Macchine.
Experimental Analysis with Extensometric Techniques for the Stress State of the Mouth and the Deep Zone of Curvature in Pressurized Vessels Analisi Sperimentale Con Tecniche Estensimetriche Dello Stato di Sollecitazione in Corrispondenza Del Bocchello E Della Zona di Raccordo Del Fondo di UN Recipiente in Pressione.
P. Citti, and S. Reale. 1974, 39p REPT-36
Language in Italian.

Descriptors: *Crack initiation, *Pressure vessels, *Stress analysis, Crack propagation, Low temperature, Nickel alloys, Steels.

For abstract, see STAR 1314

N75-22810/6GA PC$4.75/MF$2.25
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
Experimental Evaluation of the Tensor Polynomial Failure Criterion for the Design of Composite Structures.
Progress Report.
R. C. Tennyson. Mar 75, 82p NASA-CR-142701
Contracts NGR-52-026-039, NRC-A-2783

Descriptors: *Failure analysis, *Laminates, *Polynomials, *Stress tensors, *Tensor analysis, Ambient temperature, Axial stress, Computer programs, Cubic equations, Performance tests, Tables (Data).

For abstract, see STAR 1314

N75-22811/4GA PC$7.50/MF$2.25
California Univ., Los Angeles. School of Engineering and Applied Science.
The Motion of Interconnected Flexible Bodies.
Final Report.
A. S. Hopkins. Feb 75, 233p NASA-CR-120740, UCLA-ENG-7513-VOL-3
Contract NAS8-28358

Descriptors: *Coupling, *Equations of motion, *Flexible bodies, Axes of rotation, Continuum mechanics, Elastic deformation, Finite element method, Pfaff equation, Translational motion.

For abstract, see STAR 1314

N75-22813/0GA PC$7.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Stress Concentration Factors for Circular, Reinforced Penetrations in Pressurized Cylindrical Shells.
Ph.D. Thesis - Virginia Univ.
J. W. Ramsey, Jr.. May 75, 205p NASA-TM-X-68733

Descriptors: *Cylindrical shells, *Stress concentration, Circular cylinders, Computer programs, Finite element method, Pressure vessels, Stress analysis, Structural analysis.

For abstract, see STAR 1314

N75-22814/8GA PC$4.75/MF$2.25
Pisa Univ. (Italy). Ist. Di Aeronautica.
The Effect of Riveted Rigidity on the Intensity Factor of a Force in the Plane of a Crack in a Sheet l'Effetto di Irrigidimenti Rivettati Sul Fattore di Intensita Dello Sforzo in Una Lamiera Piana Tesa Fessurata.
A. Delpuglia. 1973, 84p REPT-40
Language in Italian.

Descriptors: *Cracking (Fracturing), *Stress concentration, Crack initiation, Crack propagation, Loads (Forces), Mechanical properties, Riveting, Stress analysis.

For abstract, see STAR 1314

N75-22816/3GA PC$3.25/MF$2.25
Pisa Univ. (Italy).
On the Resolution of Nonlinear Elastic and Elastoplastic Problems by the Method of Finite Elements Sulla Risoluzione Dei Problemi di Elasticita Non Lineare E di Elasto-Plasticita Attraverso Il Metodo Degli Elementi Finiti.
C. Carmignani, A. Cella, and A. Depaulis. 1974, 14p REPT-39
In Italian; English Summary.

Descriptors: *Finite element method, *Nonlinearity, Algorithms, Boundary value problems, Iterative solution, Mathematical models, Numerical analysis.

For abstract, see STAR 1314

N75-22817/1GA PC$7.50/MF$2.25
Universal Analytics, Inc., Los Angeles, Calif.
Nastran User'S Guide: Level 15.
Apr 75, 226p NASA-CR-2504
Contract NAS1-6024

Descriptors: *Structural analysis, *User manuals (Computer programs), Input/output routines.

For abstract, see STAR 1314

N75-22819/7GA PC$3.75/MF$2.25
Tokyo Univ. (Japan). Inst. of Space and Aeronautical Science.
Dynamic Behavior of Viscoelastic Shallow Spherical Shells, Volume 40, Number 1.
M. Sunakawa, and N. Kumai. Jan 75, 32p ISAS-521-VOL-40-NO-1

Descriptors: *Dynamic structural analysis, *Spherical shells, Creep buckling, Elastic buckling, Shell stability, Stress analysis, Viscoelasticity.

For abstract, see STAR 1314

20L. Solid-State Physics

AD-A011 145/0GA PC$3.25/MF$2.25
Princeton Univ N J Dept of Electrical Engineering
Electronic Surface Properties of Ionic Insulators.
Final technical rept. 1 Mar 68-31 Dec 74,
Peter Mark. Jun 75, 10p
Contract N00014-67-A-0151-0014

Descriptors: *Semiconductors, *Surface properties, Band theory of solids, Chemical compounds, Zinc sulfides, Indium antimonides, Auger electron spectroscopy, Bonding, Electrical properties, Cadmium sulfides.
Identifiers: Low energy electron diffraction, Surface energy.

The original task of this research was a study of the electronic surface properties of semiconductors and insulators with significant bonding ionicity. More specifically, it was to ascertain the extent to which bonding ionicity dominated surface electronic properties. For example, the surface structural properties of InSb are more like those of ZnS than those of either Ge or Si. One major feature of this research has been the systematic examination of the surface structure of binary II-VI and III-V semiconductors with tetrahedral coordination via low energy electron diffraction (LEED) and Auger electron spectroscopy (AES).

AD-A011 195/5GA PC$3.25/MF$2.25
California Univ Irvine Dept of Physics
Theory of Surface Polaritons in Semiconductors in Magnetic Fields,
R. F. Wallis, and J. J. Brion. 1974, 8p Rept no. 73-82
Contract N00014-69-A-0200-9003
Paper presented at Proceedings of the International Conference on Solid Surfaces (2nd), Kyoto (Japan), 25-29 Mar 74.
Availability: Pub. in Japanese Jnl. of Applied Physics, Supplement 2, Part 2, p887-892 1974.

Descriptors: *Semiconductors, *Excitation, *Indium antimonides, Solid state physics, Surfaces, Magnetic fields, Reprints.
Identifiers: *Polaritons, *Surface polaritons.

A review is given of phenomena exhibited by surface polaritons associated with surface magnetoplasmons in semiconductors. The dispersion curves for surface polaritons are calculated using Maxwell's equations and the appropriate electromagnetic boundary conditions. The results of specific calculations for n-type InSb are presented for the cases of mag-

netic field perpendicular and parallel to the surface. Of particular interest is the appearance of gaps in the dispersion curve for certain values of magnetic field and carrier concentration. The situation involving a material with multivalley energy band structure is illustrated by calculations for p-type PbTe where additional surface modes occur. When the surface magnetoplasmon frequency is near the surface optical phonon frequency, effects arising from the interaction of the two modes are found. (Author)

AD-A011 199/7GA PC$3.25/MF$2.25
New York Univ N Y Dept of Physics
Spin-Orbit Interaction and Quenched Orbital Angular Momentum in V3Si,
H. K. Fung, S. J. Williamson, C. S. Ting, and M. P. Sarachik. 7 Aug 74, 4p ARO-11125.3-P
Grants DA-ARO-D-31-124-73-G158, DA-ARO-D-31-124-73-G73
Availability: Pub. in Physical Review B, v11 n5 p2053-2055, 1 Mar 75.

Descriptors: *Vanadium compounds, *Silicides, *Phase transformations, Transition temperature, Magnetic fields, Electron paramagnetic resonance, Angular momentum, Quenching, Single crystals, Reprints.

The martensitic transformation temperature for a single crystal of V3Si in a high magnetic field has been determined as a function of field orientation. Interpretation of the results establishes limits on the magnitude of the spin-orbit interaction and indicates that the orbital angular momentum of the d electrons is quenched. (Author)

AD-A011 208/6GA PC$3.25/MF$2.25
Stanford Univ Calif Stanford Electronics Labs
The Effects of Degeneracy on Doping Efficiency for n-Type Implants in GaAs,
J. F. Gibbons, and R. E. Tremain, Jr. 11 Nov 74, 4p ARO-10290.1-EL
Contract DAHC04-72-C-0031
Availability: Pub. in Applied Physics Letters, v26 n4 p199-201, 15 Feb 75.

Descriptors: *Gallium arsenides, *Doping, Impurities, Implantation, Fermi surfaces, Energy levels, Resonant frequency, Reprints.
Identifiers: *Degeneracy.

The effect of degeneracy on doping efficiency for n-type implants in GaAs is computed by assuming the donor energy level to be coincident with the bottom of the conduction band. For such a case the Fermi level will always lie in the conduction band, and as a result the sheet carrier concentration can be substantially less than the implanted dose. Computations are given which show that peak carrier concentrations cannot readily exceed approx. 5 x 10 to the 18th power/cc and doping efficiency (as conventionally measured) can be as low as 5-10% under common implantation conditions. (Author)

AD-A011 251/6GA PC$3.25/MF$2.25
Harry Diamond Labs Adelphi Md
The Significance of Crystal-Field Parameters for the quartet I term of Nd(+3) in CaWO4.
Technical rept.,
Nick Karayianis. Dec 74, 19p Rept no. HDL-TR-1674

Descriptors: *Neodymium, Crystals, Atomic energy levels.
Identifiers: *Crystal fields, Calcium tungstates.

Previously reported analyses of the quartet I term of Nd(3+) in CaWO4 are reexamined to determine uncertainties in the reported crystal-field parameters. B(20) is kept fixed at values ranging from 250 to 800/cm, and the other B(km) are varied to obtain a best fit between theoretical and experimental energy levels for the particular value of B(20).

AD-A011 282/1GA PC$3.25/MF$2.25
Stanford Univ Calif Stanford Electronics Labs
The Electrical and Metallurgical Properties of Defects in Compound Semiconductors.
Final rept. 7 Oct 68-7 Feb 75,
Gerald L. Pearson. Apr 75, 19p Rept no. SU-SEL-75-009 ARO-2895.39-EL
Contract DAHC04-69-C-0011
See also report dated Feb 68, AD-668 930.

Descriptors: *Semiconductors, Defects(Materials), Semiconductor diodes, Gallium phosphides, Gallium arsenides, Gunn diodes, Aluminum compounds, Arsenides, Radiation effects, Epitaxial growth, Semiconducting films, Electroluminescence, Single crystals, Electrical properties, Optical properties, Transport properties, Doping, Gamma rays.
Identifiers: Electroluminescent diodes.

The program was directed toward the following five separate projects related to the electrical, optical, and metallurgical properties of defects in compound semiconductors: (1) Properties of gallium phosphide green electroluminescent diodes; (2) Effects of gamma radiation on gallium arsenide crystals and gunn diodes; (3) Liquid epitaxy and physical properties of Al(x)Ga(1-x)As; (4) Lattice defects in annealed gallium arsenide single crystals; (5) Electrical, optical, and metallurgical properties of defects in Al(x)Ga(1-x)As.

AD-A011 485/2GA PC$3.25/MF$2.25
Systems Research Labs Inc Dayton Ohio
Ohmic Contacts to Aluminum-Implanted ZnSe.
Journal article,
B. K. Shin, D. C. Look, and Y. S. Park. 11 Feb 74, 4p ARL-75-0118
Contract F33615-72-C-1099
Prepared in cooperation with Dayton Univ., Ohio. Dept of Physics, under Contract F33615-71-C-1877.
Availability: Pub. in Jnl. of the Electrochemical Society, v122 n3 p450 Mar 75.

Descriptors: *Semiconductors, *Electric contacts, Ion implantation, Zinc selenides, Aluminum, Sputtering, Substrates, Gold, Platinum, Annealing, Reprints.
Identifiers: *Ohmic contacts.

The production and characterization of ohmic contacts is an important part of semiconductor technology. In this paper we report the formation of ohmic contacts on ZnSe, by evaporating or sputtering Au or Pt onto the Al-implanted, n-type substrate. Although these metals normally form rectifying Schottky barriers on n-type ZnSe, such barriers are precluded if the implanted layer is degenerate. An advantage of Au or Pt contacts is that much higher operating temperatures are possible than with the commonly used In or Ga. (Author)

AD-A011 468/6GA PC$3.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Comparison Between Model Potential and Hartree-Fock Results for Diamond.
Journal article,
R. N. Euwema, and R. L. Greene. 6 Feb 75, 6p Rept no. ARL-75-0214
Availability: Pub. in Jnl. of Chemical Physics, v62 n11 p4455-4459, 1 Jun 75.

Descriptors: *Diamonds, *Hartree-Fock approximation, *Mathematical models, Computerized simulation, Eigenvectors, Band theory of solids, Reprints.

Two Hartree-Fock calculations were performed on diamond. One included the 1s core, while the other used the model potential proposed by V. Bonifacic and S. Huzinaga (J. Chem. Phys. 60, 2779 (1974)) in which the 1s core is excluded. The binding energies agree to 0.015 Ry/atom, the x-ray structure factors and Compton profiles to well within 0.5 percent, and the rms deviation for the valence and low conduction eigenvalues is 0.012 Ry. Some of this disagreement may be due to slightly different Gaussian contractions, integral approximations, integral approximations, etc. (Author)

AD-A011 494/2GA PC$3.75/MF$2.25
California Univ Berkeley Dept of Chemical Engineering
Viscoelastic Retardation Time Computations for Homogeneous Block Copolymers.
Technical rept.,
D. R. Hansen, and M. Shen. 1 Jul 75, 38p Rept no. TR-1
Contract N00014-75-C-0955

Descriptors: *Block copolymers, *Viscoelasticity, *Retardation, Spectra.

The Rouse-Bueche-Zimm molecular theory of viscoelasticity has been extended to compute the retardation time spectra of block copolymers of various configurations and compositions. The basic assumption of the block copolymer model is that the effect of the presence of foreign blocks on the retardation spectrum is due exclusively to the difference in the friction coefficients. Mathematically this modification is accomplished by introducing into the equations of motion a frictional coefficient matrix. Retardation spectra can then be obtained by numerically solving for the eigenvalue spectrum on a computer. Results show that the viscoelastic retardation spectra and maximum retardation times of the block copolymers vary as a function of the block configurations, block composition and the friction coefficient ratio of the blocks.

AD-A011 519/6GA PC$3.25/MF$2.25
City Coll New York Dept of Physics
Optical Mixing by Mobile Carriers in Semiconductors in the Presence of a dc Homogeneous Magnetic Field,
M. Jain, and N. Tzoar. 19 Dec 73, 7p AFOSR-TR-75-0856
Grant AF-AFOSR-1978-71
Availability: Pub. in Physical Review B, v10 n12 p5159-5163, 15 Dec 74.

Descriptors: *Charge carriers, *Mixers(Electronics), Semiconductors, Magnetic fields, Solid state electronics, Collisions, Mathematical models, Reprints.

The effect of a magnetic field on the optical mixing by mobile carriers in semiconductors is discussed for each of the two mechanisms of nonparabolic band and energy-dependent collision time. It is shown that for both these mechanisms an external magnetic field enhances the mixed output; however, the results for the two cases are suffiiciently different that a magnetic field may be used to distinguish between the two effects. (Author)

AD-A011 676/4GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Dept of Physics
Technology and Physics of Infrared and Point Contact Diodes.
Semi-annual technical rept. no. 1,
Ali Javan. 24 Jan 75, 17p AFCRL-TR-75-0071
Contract F19628-74-C-0182, ARPA Order-2618

Descriptors: *Tunneling(Electronics), Tunnel diodes, Dielectric films, Light emitting diodes, Fabrication, Thin films, Silicon compounds, Monoxides, Light sources, Cryogenics, Metal

films, Test methods, Aluminum, X Band, Microwaves, Far infrared radiation, Microwave antennas, Lead(Metal).
Identifiers: *Point contact diodes, Design, *Metal insulator metal junctions, Silicon monoxide, Electron tunneling.

Background work for this contract performed by this laboratory has shown that the tunneling characteristics of junctions formed by a very thin dielectric layer surrounded by two metals is independent of frequency (from DC through 10 micrometer wavelength). These junctions may be formed by a point contact on a lightly oxidized metal surface or by metal evaporation on such an oxidized metal surface. Work done this period involved principally relatively large evaporated structures with measurements in the microwave and far infrared regions where the circuit parameters do not mask the junction characteristics. Calculations have been performed which qualitatively resemble junction, antenna and associated parasitic parameters. A preliminary survey of far infrared incoherent sources has been conducted and such a source is being procured. The microelectronics group at Lincoln Laboratory has worked on optimizing several fabrication procedures of the printed structures. Three new structures have been designed.

COM-75-10698/9GA PC$3.75/MF$2.25
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
Standard Reference Materials: Thermal Conductivity and Electrical Resistivity Standard Reference Materials: Electrolytic Iron, SRM's 734 and 797 from 4 to 1000 K.
Final rept.,
J. G. Hust, and P. J. Giarratano. Jun 75, 46p
NBS-Special Pub-260-50
Library of Congress Catalog Card no. 74-619117.
Paper copy also available from GPO as C13.10:260-50.

Descriptors: *Iron, *Electrical resistivity, *Thermal conductivity, Uncertainty, Cryogenics, High temperature.
Identifiers: Standard reference materials.

A historical review of the development of Standard Reference Materials, SRM's, is given and selection criteria of SRM's are listed. Thermal conductivity and electrical resistivity data for electrolytic iron and similar irons are compiled, analyzed, and correlated. Recommended values of thermal conductivity and electrical resistivity for electrolytic iron, SRM's 734 and 797, are presented for the range 4 to 1000 K. These values are based on NBS measurements up to 280 K and on measurements by Oak Ridge National Laboratory on a similar iron above 280 K. The average uncertainty of the thermal conductivity values below ambient is 1.5% and 3% above ambient. The corresponding uncertainties in electrical resistivity are 1% and 2%.

COM-75-50307/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Review of Superconducting Electronics.
Final rept.,
Robert A. Kamper. Mar 75, 6p
Pub. in IEEE Transactions on Magnetics, vMAG11 n2 p141-146 Mar 75.

Descriptors: *Josephson junctions, Superconductivity, Magnetometers, Measurement.
Identifiers: Squid devices, Reprints.

The review describes the present state of affairs in applications of Josephson junctions and SQUIDs to: magnetometry, DC and RF metrology, detection and amplification of electromagnetic signals, frequency metrology, noise thermometry and computers. It also mentions recent progress in super-stable oscillators using superconducting resonant circuits, pulse transmission lines, and thin-film devices to detect radiation or charged particles.

COM-75-50369/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Electronic Structure and (121)Sb Hyperfine Fields in the Heusler Alloys Ni(1-x)Cu(x)MnSb.
Final rept.,
L. J. Swartzendruber, and B. J. Evans. Dec 74, 4p
Pub. in Jnl. of Physics, v35 n12 pC6-265/C6-268 Dec 74.

Descriptors: *Antimony containing alloys, *Hyperfine structure, Band theory of solids, Nickel containing alloys, Copper containing alloys, Manganese alloys, Magnetic properties, Palladium alloys.
Identifiers: Reprints.

At the 4.2K the magnetic hyperfine field, Hn, at Sb in the C1(b) structure alloys Ni(1-x)Cu(x)MnSb, $0 < x < 1$, increases from 196 kG at $x = 0$ to 504 kG at $x = 0.6$. For $x < 0.7$, Hn decreases rapidly and is characterized by a broad Gaussian distribution. Using the recent model of Blandin and Campbell based on the RKKY interaction, the increase of Hn with x for $x < 0.7$ can be shown to arise primarily from the increase in electron concentration. A similar explanation might also apply to the 600 kG Hn at Sb in Pd2MnSb if it is assumed that Pd contributes 0.25 electron to the conduction band. The large hyperfine fields at Sb in the above alloy systems appear to be consistent with the predictions of extant theoretical models.

COM-75-50370/6GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Construction of a Strain-Energy Function for an Isotropic Elastic Material.
Final rept.,
Jeffrey T. Fong, and Robert W. Penn. 1975, 15p
Pub. in Trans. Soc. Rheol., v19 n1 p99-113 1975.

Descriptors: *Elastomers, *Elastic theory.
Identifiers: Reprints, Hyperelastic materials.

Experimental data on the volume changes accompanying simple tension of peroxide vulcanizates of natural gum rubber, as first reported by Penn in Trans. Soc. Rheol., 14, 509 (1970), are further interpreted within the framework of the theory of a hyperelastic material. Motivated by the formal connection between a hyperelastic material and a nonlinear viscoelastic fluid (Trans. Soc. Rheol., 9, 27 (1965)), and a mathematical result on the decomposition of the scalar potential of that fluid (ZAMP, 23, 780 (1972)), the interpretation of Penn's data leads to an explicit construction of a strain-energy function for rubbery materials.

COM-75-50374/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Electronic and Catalytic Properties of Tungsten Carbide.
Final rept.,
L. H. Bennett, J. R. Cuthill, A. J. McAlister, N. E. Erickson, and R. E. Watson. 7 Mar 75, 2p
Pub. in Science, v187 p858-859, 7 Mar 75.

Descriptors: *Tungsten carbides, *Electron distribution, X ray spectra, Photoelectric emission.
Identifiers: Reprints.

The purpose of this comment is to note that two sets of experimental data, namely x-ray photoemission and soft x-ray appearance potential, are only apparently inconsistent in their measurement of the electron distribution in tungsten carbide.

COM-75-50377/1GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Lattice Dynamics of a Single Crystal of PdD(0.63).
Final rept.,
J. M. Rowe, J. J. Rush, H. G. Smith, M. Mostoller, and H. E. Flotow. 18 Nov 74, 4p
Sponsored in part by Oak Ridge National Lab., Tenn.
Pub. in Physical Review Letters, v33 n21 p1297-1300, 18 Nov 74.

Descriptors: *Lattice vibrations, *Phonons, Palladium inorganic compounds, Deuterium compounds, Dispersion relations, Single crystals, Neutron scattering, Inelastic scattering.
Identifiers: Palladium deuterides, Reprints.

The frequency-wave-vector dispersion relations of a single crystal of PdD(0.63) have been measured by coherent neutron inelastic scattering at 78, 150, 220, and 295K. The acoustic modes are considerably lower in frequency than the corresponding modes for pure Pd, in accord with the observed lattice expansion. The optic modes, in which D motions predominate, show considerable dispersion. In particular, the shape of the (100) LO branch shows conclusively that second-like-neighbor D-D interactions are comparable to the first-like-neighbor D-D interactions.

N75-23248/8GA PC$6.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Ultrasonic Coupling to Optically Generated Charge Carriers in CdS: Physical Phenomena and Applications.
Ph.D. Thesis - Washington Univ., Saint Louis, Mo.
J. S. Heyman. May 75, 152p NASA-TM-X-68732

Descriptors: *Charge carriers, *Coupling, *Lasers, *Ultrasonic radiation, Acoustic measurements, Phonons, Resonators.

For abstract, see STAR 1314

N75-23256/1GA PC$4.75/MF$2.25
Office National d'Etudes et de Recherches Aerospatiales, Toulouse (France). Dept. d'Etudes et de Recherches en Technologie Spatiale.
Cathodoluminescence of the Magnesium Fluoride Cathodoluminescence du Fluorure de Magnesium.
M. Romero. Oct 74, 77p ONERA-DERTS-NT-02-37
Language in French.

Descriptors: *Electroluminescence, *Luminous intensity, *Magnesium fluorides, *Ultraviolet spectrometers, Absorption spectra, Color centers, Correlation detection, Electron guns, Hole mobility, Pair production, Temperature effects.

For abstract, see STAR 1314

20M. Thermodynamics

N75-22290/1GA PC$3.75/MF$2.25
European Space Research Organization, Paris (France).
The Application of Temperature-Sensitive Crystals to Aerodynamic Investigations.
D. Vennemann. Jun 74, 28p ESRO-TT-77, DLR-FB-73-121
Tran-Transl. Into English of "Ueber die Verwendung Temperaturempfindlicher Kristalle bei Aerodynamischen Untersuch." Dfvlr, Porz, West Ger. Report Dlr-FB-73-121, Aug. 1973. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 10.50 Dm.

Descriptors: *Heat transfer, *Liquid crystals, *Temperature measuring instruments, Calibrating, Circular cones, Hypersonic flow, Physical properties, Wave reflection, Wind tunnel tests.

For abstract, see STAR 1314

PB-242 416/6GA PC$4.25/MF$2.25
Electric Power Research Inst., Palo Alto, Calif.
Data Reduction by an Approximate Thermal Diffusion Solution.
Special rept.,
J. M. Kendall. Mar 75, 62p EPRI-SR-8

Descriptors: *Nuclear power plants, *Reactor cores, *Heat transfer, Conduction, Nuclear fuel rods, Partial differential equations, Transfer functions, Approximation, Nuclear reactor safety, Computation, Computer programs.

A solution of the differential equations for a one dimensional time dependent heat conduction problem is used to generate approximate transfer functions for the response for the geometry defined by the boundary conditions. The resulting approximate transfer functions are used to develop a method for calculating the transient surface conditions of simulated nuclear fuel rods from known transient internal conditions. The method is applied to example cases based on the results of selected experiments. The primary advantages of the method are computational speed and stability. The principal limitations are the assumptions of constant thermal properties (independent of temperature) to obtain a linear system, and uncertainties associated with the approximate forms of transfer functions. The approximation functions are not unique; the specific functions discussed in this report were generated based on quasi-steady state considerations. For the parameters studied, the approximation for the measured temperature/surface heat flux transfer function is the most limiting. Further refinements of the approximations could be expected to reduce this source of error.

20N. Wave Propagation

AD-A011 228/4GA PC$4.25/MF$2.25
Mississippi Univ University Dept of Electrical Engineering
Transient Radiated Fields from Rectangular Apertures.
Technical rept.,
Leonard L. Tsai. 20 Dec 74, 58p RG-75-26

Descriptors: *Electromagnetic fields, Transients, Electromagnetic radiation, Apertures, Solutions(General), Time domain, Fourier transformation, Rectangular bodies, Computer programs.
Identifiers: Frequency domain.

The subject of transient electromagnetic fields has received considerable attention in recent years primarily due to the impetus provided by activities in the area of emp phenomenology. In this report, a simple theoretical model will be assumed whereby the transient electromagnetic horn is viewed as merely capturing a rectangular constant-solid-angle section of an expanding spherical wave.

AD-A011 319/1GA PC$4.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Some Post-War Developments in Ground-Based Radiowave Sounding of the Ionosphere.
Journal article,
John V. Evans. 1974, 54p Rept no. JA-4357 ESD-TR-75-157
Contract F19628-73-C-0002
Availability: Pub. in Jnl. of Atmospheric and Terrestrial Physics, v36 p2183-2234 1974.

Descriptors: *Ionospheric propagation, *Radio waves, Atmospheric sounding, Electron density, Electrons, Ions, Temperature, Electric fields, Incoherent scattering, Reviews, Reprints.

This paper briefly reviews the theory and practice of four ground-based radio wave methods of sounding the Earth's ionosphere that came into being since the Second World War. Two of the methods, Wave-Interaction (Cross Modulation) and Partial Reflection (Differential Absorption) were devised as means of investigating the D-region of the ionosphere, which is not open to study through conventional HF sounding. The third high-power radar technique discussed is the Moon-Reflection (differential-Faraday rotation) method of measuring the total content of the Earth's ionosphere. This was developed initially to determine the extent of the ionosphere above the F2-layer peak. The fourth technique discussed is the incoherent scatter method of sounding the ionosphere. This provides measurements of electron density, electron and ion temperature, some parameters of the neutral atmosphere (including winds) and electric fields. Incoherent scatter presently enjoys considerable attention as it rivals and complements in situ sampling with rockets and satellites. (Author)

AD-A011 458/7GA PC$4.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Electrical Ground Impedance Measurements in Alaskan Permafrost Regions.
Final rept.,
Pieter Hoekstra. Apr 75, 71p FAA-RD-75-25
Contract DOT-FA74WAI-429

Descriptors: *Electromagnetic wave propagation, *Ground waves(Electromagnetic), *Permafrost, Ground level, Conductivity, Alaska, Electrical resistivity, Attenuation, Measurement, Very low frequency, Low frequency, Medium frequency, Arctic regions.
Identifiers: DOT/4GZ/GB, Frozen soils.

The objective of the work described in the report is to establish the techniques leading to construction of an electrical conductivity map of Alaska in the V/L/MF frequency band for use in planning of navigational aids. Several difficulties were encountered in using ground conductivity data of high quality to construct a conductivity map of Alaska. They are: (a) The results showed that the ground conductivity in permafrost areas of North America is very heterogeneous, so that it is not directly apparent how to assign an effective conductivity value to a path of practical length (about 100 km); and, (b) The geological and permafrost conditions very much in Alaska, so that measurements at a location are representative of a small area only, leaving large areas of Alaska open to question. Theoretical evaluations of the seasonal changes in ground conductivity and their effect on radiowave propagation and electrical grounding are also discussed.

AD-A011 668/1GA PC$4.25/MF$2.25
Bdm Corp Albuquerque N Mex
The EMCAP (Electromagnetic Compatibility Analysis Program) - Iterative Techniques in the Method of Moments.
Phase rept. 2 Oct 74-1 Jan 75,
T. R. Ferguson. May 75, 61p Rept no. BDM/A-14-75-TR RADC-TR-75-121
Contract F30602-74-C-0182

Descriptors: *Electromagnetic compatibility, Iterations, Computer programming, Matrices(Mathematics).
Identifiers: *Method of moments.

The report contains a detailed discussion of iterative techniques to solve large systems of linear equations. Included in this is the development of the banded matrix iteration scheme with some early results that apply the theory to single wires.

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A011 349/8GA PC$3.75/MF$2.25
Cornell Univ Ithaca N Y Dept of Theoretical and Applied Mechanics
Monopropellant Decomposition in a Hot Inert Atmosphere.
Technical rept.,
Geoffrey S. S. Ludford, and Daniel W. Yannitell. Oct 74, 26p Rept no. TR-61 ARO-5329.69-M
Grants DA-ARO-D-31-124-71-G163, NSF-GP-40965
See also Part 2 dated Nov 74, AD-A011 350.

Descriptors: *Monopropellants, *Decomposition, *Vaporization, Activation energy, Drops, Heat of vaporization, Diffusion.

The title problem for a spherical droplet is considered when the activation energy is large. Asymptotic solutions are obtained, which describe a monotonic increase of the vaporization rate M as the Damkohler number D increases from 0 to infinity. When the specific heat of vaporization is large enough there is a threshold D beyond which M stays constant; otherwise M increases indefinitely, with a convective-diffusive boundary layer forming at the surface of the droplet.

AD-A011 350/6GA PC$3.75/MF$2.25
Cornell Univ Ithaca N Y Dept of Theoretical and Applied Mechanics
Monopropellant Decomposition in a Hot Inert Atmosphere. Part 2. Maximum Zone Temperature.
Technical rept.,
Geoffrey S. S. Ludford, and Daniel W. Yannitell. Nov 74, 36p Rept no. TR-64 ARO-12373.4-M
Grants DAHC04-75-G-0016, NSF-GP-40965
See also Part 1 dated Oct 74, AD-A011 349.

Descriptors: *Monopropellants, *Decomposition, *Vaporization, Temperature, Drops.

The title problem for a spherical droplet is again considered for large activation energy, but now when the zone temperature is maximum rather than intermediate (as it was in Part 1). Asymptotic solutions are thereby obtained for the remaining hot atmosphere problems, which describe a monotonic decrease of the vaporization rate with increasing Damkohler number, i.e. 'moderate' decomposition.

AD-A011 351/4GA PC$3.75/MF$2.25
Cornell Univ Ithaca N Y Dept of Theoretical and Applied Mechanics
Monopropellant Decomposition in a Cold Inert Atmosphere.
Technical rept.,
Geoffrey S. S. Ludford, Daniel W. Yannitell, and John D. Buckmaster. Feb 75, 31p Rept no. TR-66 ARO-12373.1-M
Grants DAHC04-75-G-0016, NSF-GP-40965

Descriptors: *Decomposition, *Monopropellants, *Vaporization, Drops, Activation energy, Temperature.

The title problem for a spherical droplet is considered when the activation energy is large, the zone temperature now always being the maximum. Asymptotic solutions are thereby obtained for the remaining inert atmosphere problems, which describe a monotonic decrease of the vaporization rate M with increasing Damkohler number D, i.e., the lower branch of the C-shaped response curve. In particular there is a threshold D beyond which M stays constant.

AD-A011 352/2GA PC$3.25/MF$2.25
Cornell Univ Ithaca N Y Dept of Theoretical and Applied Mechanics
Ignition and Extinction of a Monopropellant Droplet in an Inert Atmosphere.
Technical rept.,
Ashwani K. Kapila, Geoffrey S. S. Ludford, and John D. Buckmaster. Mar 75, 25p Rept no. TR-68 ARO-12373.3-M
Grant DAHC04-75-G-0016

Descriptors: *Monopropellants, *Ignition, *Vaporization, Extinguishing, Drops, Decomposition, Heat transfer.

Response curves of vaporization rate versus Damkohler number are examined in the limit of large activation energy, so as to determine their weak-and strong-decomposition branches. A recipe is given for locating the ignition point at the end of the former, when there is one; and an explicit formula is derived for the extinction or ignition/extinction point at the end of the latter, when there is one.

AD-A011 663/2GA PC$4.25/MF$2.25
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
A Computer Program for the Calculation of Adiabatic Flame Temperature and Equilibrium Chemical Composition in Constant Pressure and Constant Volume Systems.
Final rept. Jun 73-Jun 74,
Dennis E. Walsh, and Kervyn D. Mach. Mar 75, 72p Rept no. AFAPL-TR-74-67

Descriptors: *Computer programs, *Flames, Temperature, Chemical composition, Thermodynamics, Chemical equilibrium, Specific heat, FORTRAN.
Identifiers: AJAX computer program.

This report presents a computer program for the calculation of the adiabatic flame temperature and equilibrium chemical composition of constant pressure and constant volume systems. It is capable of treating either hydrocarbon or hydrogen fuels with either air or pure oxygen as the oxidizing agent. A solution procedure is presented which is fast, accurate and numerically stable. Analytical heat capacity equations are used to generate required thermodynamic data, thus avoiding the necessity of storing and interpolating lengthy data tables. The technique lends itself to the easy inclusion of additional chemical species which may be of interest under certain circumstances. The ideal gas assumption is used throughout the analysis.

N75-22321/4GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Gas Sampling Method for Determining Pollutant Concentrations in the Flame Zone of Two Swirl-Can Combustor Modules.
R. A. Duerr. May 75, 25p NASA-TM-X-3227, E-8211

Descriptors: *Combustion chambers, *Flames, *Gas analysis, *Pollution monitoring, Carbon monoxide, Concentration (Composition), Design analysis, Hydrocarbons.

For abstract, see STAR 1314

21D. Fuels

AD-A011 341/5GA PC$3.25/MF$2.25
Southwest Research Inst San Antonio Tex Army Fuels and Lubricants Research Lab
Status of Research on Antimist Aircraft Turbine Engine Fuels in the United States,
W. D. Weatherford, Jr., and B. R. Wright. Apr 75, 12p
Contract DAAK02-73-C-0221
Presented at AGARD/NATO Meeting (45th) Propulsion and Energetics Panel on Aircraft Fire Safety, Rome, 7-11 Apr 75.

Descriptors: *Jet engine fuels, *Fuel additives, *Fire safety, Aircraft fires, Mist, Polymers, Flammability, Rheology.
Identifiers: *Antimist agents, JP-5 fuel, Jet A-1 fuel, JP-4 fuel, JP-8 fuel.

Research being conducted by the U.S. Army, Air Force, Navy, and the Federal Aviation Administration (and the U.K. Royal Aircraft Establishment) has been directed toward establishing the physical, compatibility, and fire-safety characteristics of fuel blends containing polymeric antimist agents. This antimist additive approach has been shown to be both feasible and potentially practical for substantially reducing the frequency of in-flight and post-crash aircraft fires. This paper describes the experimental bench (and larger-scale) evaluation procedures that are being used in the antimist fuel studies, and reviews the experimental results obtained by various U.S. organizations, using several different polymeric antimist additives.

AD-A011 539/4GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Microbiological Evaluation of Aviation Fuel Storage, Dispensing and Aircraft Systems.
Final rept. 1 Jun-31 Aug 74,
Sheldon A. London. Nov 74, 24p Rept no. AMRL-TR-74-144

Descriptors: *Fuel systems, *Contamination, *Bacteria, Aircraft equipment, Fungi, Jet engine fuels, Air Force facilities.
Identifiers: JP-4 fuel, JP-5 fuel.

Recent unconfirmed reports of problems in refueling systems induced by microbial activity prompted an investigation of refueling facilities at four Air Force bases. The distribution and servicing systems and aircraft surveyed were remarkably free of water, only 26 of 66 attempts to obtain water being successful. Those samples in which water was found contained considerably less than observed in previous field investigations. Fuel System Icing Inhibitor, known to exert an inhibitory effect on microorganisms, was present in the water bottom samples in concentrations ranging from 7 to 25% by volume. Microbial levels, both fungal and bacterial were inconsequential. This survey has shown the facilities evaluated to be free of significant microbial contamination, attesting to the beneficial results of excellent housekeeping procedures.

AD-A011 588/1GA PC$4.25/MF$2.25
Civil Engineering Lab (Navy) Port Hueneme Calif
Design for Corrosion Control of Aviation Fuel Storage and Distribution Systems.
Final rept. 15 Oct 70-15 Oct 74,
Fred Reinhart. Jun 75, 60p AFWL-TR-74-31

Descriptors: *Fuel systems, *Corrosion, *Fuel tanks, *Aviation fuels, Corrosion inhibition, Storage tanks, Protective coatings, Plastics, Cathodic protection, Costs, Reviews.

An exhaustive review was made of the literature on corrosion problems and their control as they pertain to aviation fuel storage and distribution systems. It covers the many corrosion-related variables encountered with respect to the different types of fuels storage tanks and the distribution lines essential to supplying uncontaminated fuels to planes. Methods of reducing the corrosion of metals used in these systems are considered by identifying potential causes for corrosion in the soil, other external environments to be encountered and in fuels themselves. Different procedures to anticipate and control corrosion are presented, including the use of protective coatings, cathodic protection, and plastics composites as a substitute for metals. Problem areas such as galvanic corrosion, proper surface preparation and techniques for application of protective coatings are considered. Guidelines are given that combine economic considerations with practical corrosion control procedures that will give the most efficient service life compatible with a projected time-of-use requirement.

N75-22910/4GA PC$3.25/MF$2.25
European Space Research Organization, Paris (France).
On the Application of Hydrogen as a Fuel for Automotive Vehicles.
A. Gann. Feb 75, 18p ESRO-TT-132, DLR-MITT-73-22
Tran-Transl. Into English of "Ueber die Verwendung von Wasserstoff als Triebstoff fuer Automobile" Dfvlr, Porz, West Ger. Report Dlr-Mitt-73-22, 27 Apr. 1973. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 8.90 Dm.

Descriptors: *Energy storage, *Hydrogen, *Hydrogen-based energy, *Liquid hydrogen, *Metal hydrides, Automobiles, Cryogenic fluid storage, Storage tanks.

For abstract, see STAR 1314

PB-242 131/1GA PC$4.25/MF$2.25
California Univ., Los Angeles. School of Engineering and Applied Science.
Studies Pertaining to Hydrogen Car Development. Part B. A Comparative Study of Engine Performance with Gasoline and Hydrogen. Part C. Hydrogen Storage and Flow System,
William D. Van Vorst. Oct 74, 55p UCLA-ENG-7489-Pt-B/C DOT/TST-75-99
Contract DOT-OS-40011

Descriptors: *Hydrogen, *Automotive fuels, *Fuel storage, Hydrides, Liquid hydrogen, Gasoline, Comparison, Performance tests, Performance evaluation, Feasibility, Systems design.
Identifiers: DOT/4EZ/EA, DOT/4DZ/DB.

A comparative study of the performance of an engine operating on gasoline and on hydrogen is presented. Results indicate thermal efficiencies of from 25 to 100% greater with hydrogen than with gasoline. The emission of nitrogen oxides was reduced approximately 90% when operating on hydrogen. With quality-governed, hydrogen operation, however, maximum power output is reduced by as much as 50%; with water injection, the figure might be 30%. The problem of the storage of hydrogen is addressed. In particular, metal hydride and liquid systems are compared. A liquid hydrogen system was developed and installed in a 1973 Jeep. Details of the system are presented. It was found to be basically feasible and operating experience thus far is favorable.

PB-242 166/7GA PC$8.50/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
The Economics of the Natural Gas Shortage (1960-1980),
Paul W. MacAvoy, and Robert S. Pindyck. Sep 74, 264p* MIT-EL-74-011 NSF/RA/N-74-204
Grant NSF-GI-34936

Descriptors: *Natural gas, *Fuel shortages, *Gas industry, Energy shortages, Economic models, Econometrics, Government policies, National government, Regulations, Control, Demand(Economics), Economic analysis, Forecasting.

This report describes an econometric policy model of the natural gas industry. The structure

of the model is described in detail, as is the estimation of the model's equations. The model is then used in a variety of policy simulations to analyze the past and probable future behavior of the natural gas industry under alternative FPC regulatory policies.

PB-242 184/0GA PC$3.25/MF$2.25
Bureau of Mines, Bartlesville, Okla. Bartlesville Energy Research Center.
Optimum Automotive Use of the Combustion Characteristics of Gas from Coal-Low Pollution Considerations.
Rept. of Investigations,
J. R. Allsup, and R. D. Fleming. Apr 75, 21p
BuMines-RI-8040

Descriptors: *Automotive fuels, *Coal gas, Natural gas, Manufactured gas, Synthesis gas, Combustion, Compression ratio, Photochemical reactions, Carbon monoxide, Hydrocarbons, Aldehydes, Crankcase fumes, Chemical analysis, Comparison, Performance tests, Performance evaluation, Automobiles, Substitutes, Catalysts.
Identifiers: Fuel substitution.

The Bureau of Mines studied the characteristics of simulated coal gas as an automotive fuel in two multicylinder vehicles in a standard and high compression-ratio engine configuration. The investigation emphasized the engine parameters necessary for optimum use of the fuel with repect to engine efficiency and low exhaust emissions.

PB-242 229/3GA PC$3.75/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Electric Utility Fuel Choice Behavior in the United States,
Paul L. Joskow, and Frederick S. Mishkin. Oct 74, 40p* MIT-EL-74-015 NSF/RA/N-74-202
Grant NSF-SIA73-07871

Descriptors: *Electric power plants, *Electric utilities, *Fossil fuel power plants, Fossil fuels, Coal, Fuel oil, Natural gas, Cost analysis, Economic models, Econometrics, Capitalized costs, Conditional probability, Fuel consumption, United States.
Identifiers: Steam power plants.

This paper reports the specification and estimation of a set of fuel choice reltionships for fossil fuel base load steam-electric plant. The fuel choice decision is analyzed to explicitly take account of the discreteness of fuel-burning techniques available to the firm. For this purpose a probability model of the conditional logit form is used. The relationships were estimated using maximum likelihood techniques.

PB-242 230/1GA PC$4.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Interfuel Substitution in the Consumption of Energy in the United States. Part II: Industrial Sector,
Martin L. Baughman, and Frederick S. Zerhoot. 25 Apr 75, 54p* MIT-EL-75-007 NSF/RA/N-75-034
Grant NSF-SIA73-07871
See also report dated 25 May 74, PB-234 536.

Descriptors: *Fuel consumption, Economic models, Electric power demand, Econometrics, Economic analysis, Mathematical models, Coal, Fuel oil, Natural gas, Electricity, Prices, Cost comparison, Rates(Costs), Substitutes, Industries, Industrial plants, Forecasting, Simulation, United States.
Identifiers: *Interfuel competition, Fuel substitution.

Specified and estimated are a set of derived demand functions for energy in the industrial sector of the United States. A three level model is used, consisting of: (1) an equation relating aggregate United States energy consumption in the industrial sector to value-added in manufacturing and average energy prices; (2) a set of equations interrelating geographical patterns of energy consumption by state to cross-sectional energy costs; and (3) a set of fuel split relationships that interrelate the fuel consumption configuration (coal, natural gas, oil, and electricity) to relative prices of the alternative energy forms. The model is dynamically specified and estimated with data for a time-series of cross-section for the U.S. Simulations to 1985 derived from the model are reported and compared to recent Federal Energy Administration forecasts.

21E. Jet and Gas Turbine Engines

AD-A011 451/2GA PC$4.25/MF$2.25
Naval Air Engineering Center Lakehurst N J Ground Support Equipment Dept
Survey on Current and Proposed Diagnostic Systems.
G. F. Bucsek. Jan 75, 57p Rept no. NAEC-GSED-88

Descriptors: *Jet engines, *Diagnosis(General), *Diagnostic equipment, Monitoring, Vibration, Leakage(Fluid), Malfunctions, Ground support equipment.
Identifiers: *In flight monitoring, *Malfunction detection, *Engine diagnostics.

This report provides a review of what has been done and is being done in the area of engine diagnostics and recommends possible approaches for a non-integrated diagnostic system for current aircraft. This study was performed to determine what present systems might be applicable to ground support activities either as they stand, or with additional development.

AD-A011 595/6GA PC$6.25/MF$2.25
Michigan Univ Ann Arbor Dept of Industrial and Operations Engineering
Aircraft Engines: Demand Forecasting and Inventory Redistribution.
Final rept. 15 May 73-15 Mar 74,
Herbert P. Galliher, and Richard C. Wilson. Feb 75, 152p ARL-75-0008
Contract F33615-73-C-4158

Descriptors: *Jet engines, *Spare parts, *Replacement theory, Inventory control, Logistics planning, Inventory analysis, Failure, Predictions.
Identifiers: J-79 engines, J-79-15 engines, J-79-17 engines, *Logistics management.

Using historical experience with J79 engines, an investigation was made of the quantitative relationships between engine age, utilization, overhaul-rate, failure-rate, and fleet age-distribution. Based upon these considerations, a new computerized method for forecasting demand for spare engines is proposed to replace present AFM 400-1 procedures. A procedure for redistributing multi-indentured stocks of repairable components and assemblies from depot to base is proposed. The procedure requires forecasts of removal rates, base-to-depot return rates, MOD-METRIC-like stock-allocation levels, repair and ship times as inputs. Whenever a stock unit becomes available at the depot or is required at a base, the procedure determines in real time a stock allocation which seeks to minimize long-run expected system backorders.

COM-75-10754/0GA PC$7.00/MF$2.25
General Electric Co., Schenectady, N.Y. Gas Turbine Products Div.
Marine Gas Turbine Applications Manual. Volume I. Heavy-Duty Gas Turbine Design, Performance, and Application Data.
Final rept. on Task 8 (Volume A),
S. M. Kaplan. 1 Apr 75, 178p 75GTD7 MA-RD-920-75065
Contract MA-0-35510
*Maritime Administration, Washington, D.C. Office of Marine Technology.

Descriptors: *Merchant ships, *Marine surface propulsion, *Gas turbine engines, Gas turbine power generation, Regenerators, Performance evaluation, Turbine components, Control equipment.

This document describes a part of the work performed within Task 8, Marine Systems Engineering and Analysis of the Heavy-Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy-duty gas turbine as an alternate competitive form of marine power generation. The costs of this program are shared equally by the U.S. Department of Commerce, Maritime Administration and the General Electric Company, Gas Turbine Products Division. This document represents one of three volumes of the Task 8 Final Report. It presents Vol. I, Design, Performance and Application Data of the Marine Gas Turbine Applications Manual developed in this task. This specific volume covers gas turbine design parameters, performance, and application data to permit owners, naval architects, and shipyards to select the correct gas turbine and to evaluate performance of the integrated system.

N75-22289/3GA PC$7.50/MF$2.25
Saarland Univ., Saarbrucken (West Germany). Inst. fuer Mathematik.
Investigation of Sound Emission from a Jet Engine Inlet in an Axial Flow.
Ph.D. Thesis.
N. Friedrich. 3 Feb 75, 232p DLR-FB-75-24
In German; English Summary.

Descriptors: *Axial flow, *Inlet nozzles, *Jet aircraft noise, *Jet engines, *Noise propagation, *Sound generators, Air ducts, Coaxial flow, Compressible fluids, Compressor rotors, Far fields, Fourier analysis, Mathematical models, Pressure distribution, Reflectance, Subsonic flow, Velocity distribution.

For abstract, see STAR 1314

N75-22320/6GA PC$4.25/MF$2.25
Rockwell International Corp., Los Angeles, Calif.
Testing of Lift/Cruise Fan Exhaust Deflector.
D. W. Schlundt. Mar 75, 68p NASA-CR-137682, NA-75-227
Contract NAS2-7657

Descriptors: *Blast deflectors, *Exhaust nozzles, *Lift fans, *Short takeoff aircraft, Flow characteristics, Performance tests, Propulsion system configurations, Propulsive efficiency, Static tests, Thrust vector control.

For abstract, see STAR 1314

N75-22323/0GA PC$5.75/MF$2.25
AiResearch Mfg. Co., Phoenix, Ariz.
Study of Small Civil Turbofan Engines Applicable to Military Trainer Airplanes.
Final Report.
R. W. Heldenbrand, G. L. Merrill, and G. A. Burnett. Apr 75, 138p NASA-CR-137575, AIRESEARCH-74-210987-A
Contract NAS2-6799

Descriptors: *Aircraft design, *Engine design, *Training aircraft, *Turbofan engines, Aerodynamic characteristics, Aerodynamic

configurations, Cost effectiveness, Design analysis.

For abstract, see STAR 1314

N75-22325/5GA PC$5.75/MF$2.25
General Electric Co., Cincinnati, Ohio.
Experimental Quiet Engine Program.
Summary Report.
W. G. Cornell. Mar 75, 127p NASA-CR-2519, R74AEG307
Contract NAS3-12430

Descriptors: *Low noise, *Noise reduction, *Turbofan engines, Acoustic attenuation, Acoustic simulation, Design analysis, Jet aircraft noise, Propulsion system performance, Tradeoffs.

For abstract, see STAR 1314

N75-22327/1GA PC$3.25/MF$2.25
Pisa Univ. (Italy). Ist. di Aeronautica.
Calculation of Axisymmetrical Oscillation of Flexible Turbine Discs Calcolo Delle Oscillazioni Assialsimmetriche Flessionali Dei Dischi Delle Turbine.
G. Nerli. 1974, 25p REPT-41
Language in Italian.

Descriptors: *Finite element method, *Oscillations, *Rotating disks, *Turbine blades, Flexible bodies, Pulses, Ring structures, Stresses, Vibration mode.

For abstract, see STAR 1314

N75-22624/1GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Measurement of Pressure in Turbomachine Impellers at High Rotational Velocities.
I. M. Korshin. May 75, 6p NASA-TT-F-16292
Contract NASW-2481
Tran-Transl. Into English from TR. Kai. (Kazan), Issue 156, 1973 p 17-20.

Descriptors: *Impellers, *Pressure measurements, *Rotating shafts, Pressure sensors, Turbomachinery.

For abstract, see STAR 1314

N75-22629/0GA PC$7.50/MF$2.25
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Investigation of Secondary Flow Behavior and End Wall Boundary Layer Development Through Compressor Cascades.
J. W. Salvage. Jun 74, 239p TN-107

Descriptors: *Boundary layer flow, *Cascade flow, *Compressor blades, *Turbocompressors, *Wall flow, Aspect ratio, Dynamic models, Flow distribution, Fluid dynamics, Incompressible flow, Secondary flow, Vortices.

For abstract, see STAR 1314

N75-22745/4GA PC$8.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Dot/NASA Comparative Assessment of Brayton Engines for Guideway Vehicles and Busses. Volume 2: Analysis and Results.
1975, 284p NASA-SP-354-VOL-2

Descriptors: *Gas turbine engines, *Technology assessment, *Urban transportation, Air pollution, Energy consumption, Engine design, Noise pollution, Urban planning.

For abstract, see STAR 1314

PATENT-3 880 550 Not available NTIS
Department of the Air Force Washington D C
Outer Seal for First Stage Turbine.
Patent,
Arthur F. Corey, and Bruce E. Snyder. Filed 22 Feb 74, patented 29 Apr 75, 3p Rept nos. PAT-APPL-445 047,
Supersedes AD-164 737.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Gas turbines, *Gas seals, *Patents, Bonding, Abrasives, Corrosion resistant alloys, Laminates.
Identifiers: PAT-CL-415-174.

The patent relates to an outer air seal for the first stage turbine of an engine having the seal segments made of a high strength base material with a highly oxidation-corrosion resistant abradable alloy layer bonded to the surface thereof on the side adjacent the rotor blade. Another embodiment has an abrasive layer bonded to the high strength base material with the abradable layer being bonded to the abrasive layer.

21G. Reciprocating Engines

PAT-APPL-574 208/GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Pasadena Office, Calif.
Stirling Cycle Engine and Refrigeration Systems.
Patent Application.
W. H. Higa. Filed 5 May 75, 23p NASA-CASE-NPO-13613-1
Contract NAS7-100
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Piston engines, *Refrigerating machinery, *Stirling cycle, Combustion chambers, Fluid power, *Patent applications, Piston theory, Pressure distribution, Working fluids.

A Stirling cycle heat engine is described in which displacer motion is controlled as a function of the working fluid pressure and a substantially constant pressure. The heat engine includes an auxiliary chamber at the constant pressure, and an end surface of a displacer piston is disposed in the auxiliary chamber. During the compression portion of the engine cycle when the fluid pressure rises above the constant pressure, the displacer forces the working fluid to pass from the cold chamber to the hot chamber of the engine. During the expansion portion of the engine cycle the heated working fluid in the hot chamber does work by pushing down on the engine's drive piston. As the working fluid pressure drops below the constant pressure, the displacer forces most of the working fluid in the hot chamber to pass through the regenerator to the cold chamber. The engine is easily combinable with a refrigeration section to provide a refrigeration system in which the engine's single drive piston serves both the engine and the refrigeration section.

21H. Rocket Motors and Engines

N75-22373/5GA PC$7.25/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Frontiers in Propulsion Research: Laser, Matter-Antimatter, Excited Helium, Energy Exchange Thermonuclear Fusion.
D. D. Papailiou. 15 Mar 75, 213p NASA-CR-142707, JPL-TM-33-722
Contract NAS7-100

Descriptors: *Annihilation reactions, *Energy transfer, *Laser applications, *Spacecraft propulsion, *Thermonuclear reactions, Antimatter, Helium, Matter (Physics), Plasma physics, Propulsion system configurations, Storage stability.

For abstract, see STAR 1314

21I. Rocket Propellants

AD-A011 564/2GA PC$5.25/MF$2.25
Mathematical Sciences Northwest Inc Bellevue Wash
Three-Dimensional Grain Stress Analysis Based on the Boundary Integral Equation Method. Volume I. Analytical Formulation.
Final rept. 6 Mar 73-7 Jan 75,
Alexander L. Deak. Apr 75, 107p Rept no. MSNW-75-316-1-Vol-1 AFRPL-TR-75-18-Vol-1
Contract F04611-73-C-0059
See also Volume 2, AD-A011 565.

Descriptors: *Solid rocket propellants, *Rocket propellant grains, *Stress analysis, Stress concentration, Strain(Mechanics), Potential theory, Finite element analysis, Numerical methods and procedures, Computer programming, Integral equations.
Identifiers: CDC 6600 computers, SINGUL computer program.

This report presents the theory of the three-dimensional grain stress analysis program based on the boundary integral equation method, which is based on a surface integral representation of the theory of elasticity for isotropic and linearly elastic solids. The boundary integral equation method is also extended to include body forces which are derivable from a potential function. Particular boundary solutions are generated within the strain potential approach which are combined with the prescribed boundary conditions to define a homogeneous problem. This problem is then solved by the boundary integral equation method. Cyclic symmetry considerations are also included in the analysis. The numerical results are compared with those of the finite element analysis for typical solid propellant grain configurations. Volume I is devoted to theoretical and numerical formulations.

AD-A011 565/9GA PC$5.75/MF$2.25
Mathematical Sciences Northwest Inc Bellevue Wash
Three-Dimensional Grain Stress Analysis Based on the Boundary Integral Equation Method. Volume II. User's Manual.
Final rept. 6 Mar 73-7 Jan 75,
Alexander L. Deak. Apr 75, 126p Rept no. MSNW-75-316-1-Vol-2 AFRPL-TR-75-18-Vol-2
Contract F04611-73-C-0059
See also Volume 1, AD-A011 564 and Volume 3, AD-A011 566.

Descriptors: *Solid rocket propellants, *Rocket propellant grains, *Stress analysis, Stress concentration, Strain(Mechanics), Potential theory, Finite element analysis, Numerical methods and procedures, User needs, Computer programming, Integral equations.
Identifiers: CDC 6600 computers, SINGUL computer program.

This report presents the theory of the three-dimensional grain stress analysis program based on the boundary integral equation method, which is based on a surface integral representation of the theory of elasticity for isotropic and linearly elastic solids. The boundary integral equation method is also extended to include body forces which are derivable from a potential function. Particular boundary solutions are generated within the strain potential approach which are combined with the prescribed boundary conditions to define a homogeneous problem. This problem is then solved by the boundary integral equation method. Cyclic symmetry considerations are also included in the analysis. The numerical results are compared with those of the finite

element analysis for typical solid propellant grain configurations. Volume 2 is the user's manual.

AD-A011 586/7GA PC$8.75/MF$2.25
Mathematical Sciences Northwest Inc Bellevue Wash
Three-Dimensional Grain Stress Analysis Based on the Boundary Integral Equation Method. Volume III. Program Listing.
Final rept. 6 Mar 73-7 Jan 75,
Alexander L. Deak. Apr 75, 290p Rept no. MSNW-75-316-1-Vol-3 AFRPL-TR-75-18-Vol-3
Contract F04611-73-C-0059
See also Volume 2, AD-A011 565.

Descriptors: *Solid rocket propellants, *Rocket propellant grains, *Stress analysis, Stress concentration, Strain(Mechanics), Potential theory, Finite element analysis, Numerical methods and procedures, Computer programs.
Identifiers: CDC 6600 computers, SINGUL computer program.

This report presents the theory of the three-dimensional grain stress analysis program based on the boundary integral equation method, which is based on a surface integral representation of the theory of elasticity for isotropic and linearly elastic solids. The boundary integral equation method is also extended to include body forces which are derivable from a potential function. Particular boundary solutions are generated within the strain potential approach which are combined with the prescribed boundary conditions to define a homogeneous problem. This problem is then solved by the boundary integral equation method. Cyclic symmetry considerations are also included in the analysis. The numerical results are compared with those of the finite element analysis for typical solid propellant grain configurations. Volume 3 contains the listing of the computer code written for the CDC-6600 machine.

N75-22467/5GA PC$3.25/MF$2.25
Institut fuer Chemie der Treibstoffe, Berghausen (West Germany).
Properties of Fast Burning Composite Double Base Fuels Eigenschaften Schnellbrennender Cdb-Treibstoffe.
W. Kloehn. 31 Dec 73, 25p ICT-13/73
Language in German.

Descriptors: *Composite propellants, *Double base rocket propellants, *Propellant properties, Aluminum, Ammonium perchlorates, Burning rate, Cellulose nitrate, Nitroglycerin, Polyurethane foam, Propellant additives, Propellant grains, Propellant storage, Viscoelasticity.

For abstract, see STAR 1314

N75-22627/4GA PC$5.25/MF$2.25
Martin Marietta Corp., Denver, Colo.
Finite Element Solution of Low Bond Number Sloshing.
Final Report.
R. L. Wohlen, A. C. Park, and D. M. Warner. Apr 75, 123p NASA-CR-120299, MCR-75-139
Contract NAS8-29946

Descriptors: *Finite element method, *Liquid rocket propellants, *Liquid sloshing, Computer techniques, Interfacial tension, Tank geometry, Vibration mode.

For abstract, see STAR 1314

22. SPACE TECHNOLOGY

22A. Astronautics

AD-A011 648/3GA PC$3.75/MF$2.25
Arnold Engineering Development Center Arnold Air Force Station Tenn
Pitch-, Yaw-, and Roll-Damping Characteristics of a Shuttle Orbiter at M = 8.
Final rept. 24 Jun-26 Jul 74,
Bob L. Uselton, and Leroy M. Jenke. May 75, 36p Rept no. AEDC-TR-74-129
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn. Rept. no. ARO-VKF-TR-74-100.

Descriptors: *Space shuttles, *Supersonic characteristics, Manned spacecraft, Pitch(Motion), Damping, Yaw, Angle of attack, Wind tunnel models.
Identifiers: 089 ORBITERS, 089B orbiters.

Wind tunnel tests were conducted for NASA-Langley at M = 8 to determine the pitch-, yaw-, and roll-damping characteristics of a modified 089B shuttle orbiter configuration. Data were obtained utilizing the small-amplitude forced-oscillation technique at angles of attack of -4.9 to 26.5 deg at Reynolds numbers, based on model length, of 1,180,000 to 4,820,000. The orbiter was dynamically stable in pitch, yaw, roll, and statically unstable in yaw for the moment reference of the test configurations. The pitch derivatives were dependent on Reynolds number while the roll derivatives were independent of Reynolds number.

N75-22351/1GA PC$7.00/MF$2.25
Martin Marietta Corp., Denver, Colo. Planetary Systems Mission Analysis and Operations Section.
Mission Analysis Program for Solar Electric Propulsion (Mapsep). Volume 2: User'S Manual for Earth Orbital Mapsep.
Apr 75, 178p NASA-CR-120407
Contract NAS8-29666
Misc-Revised.

Descriptors: *Mission planning, *Solar electric propulsion, *User manuals (Computer programs), Error analysis, Input/output routines, Trajectory analysis.

For abstract, see STAR 1314

N75-22352/9GA PC$13.00/MF$2.25
Martin Marietta Corp., Denver, Colo. Planetary Systems Mission Analysis and Operations Section.
Mission Analysis Program for Solar Electric Propulsion (Mapsep). Volume 3: Program Manual for Earth Orbital Mapsep.
Apr 75, 564p NASA-CR-120408
Contract NAS8-29666

Descriptors: *Mission planning, *Solar electric propulsion, *User manuals (Computer programs), Computer programs, Error analysis, Input/output routines, Trajectory optimization.

For abstract, see STAR 1314

N75-23145/6GA PC$4.25/MF$2.25
North Carolina State Univ., Raleigh.
The Utilization of Habrobracon and Artemia as Experimental Materials in Bioastronautic Studies.
Final Report.
D. S. Grosch. Sep 72, 62p NASA-CR-114590
Contract NAS2-6684

Descriptors: *Artemia, *Bioastronautics, *Biosatellite 2, *Cysts, Fertility, Radiation effects, Reproduction, Reproductive systems.

For abstract, see STAR 1314

N75-23164/7GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Life and Work on Board a Space Station.
I. Pestov. May 75, 8p NASA-TT-F-16283
Contract NASW-2483
Tran-Transl. Into English from Aviatsiya i Kosmonavtika (Ussr), No. 11, Nov. 1974 p 38-39.

Descriptors: *Astronaut performance, *Cosmonauts, *Salyut space station, Flight stress (Biology), Human factors engineering, Human reactions, Long term effects, Medical equipment, Physiological tests, Space flight feeding.

For abstract, see STAR 1314

N75-23165/4GA PC$6.25/MF$2.25
General Electric Co., Houston, Tex.
Crew Interface Specifications Development for Inflight Maintenance and Stowage Functions.
Final Report.
J. G. Carl. 12 Nov 74, 152p NASA-CR-141775
Contract NAS9-13375

Descriptors: *Data bases, *In-flight monitoring, *Maintenance, Management planning, Space flight.

For abstract, see STAR 1314

N75-23446/8GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Analysis of Terrain Conditions in the Landing Site of the MARS-6 Automatic Interplanetary Station.
R. B. Zezin, V. P. Karyagin, I. P. Mamoshina, N. A. Morozov, and V. M. Pavlova. May 75, 15p NASA-TT-F-16349
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 99-107.

Descriptors: *Landing sites, *Mars landing, *Mars probes, *Terrain analysis, Atmospheric pressure, Craters, Mars atmosphere, Mars surface, Planetary mapping.

For abstract, see STAR 1314

22B. Spacecraft

AD-A011 198/9GA PC$3.25/MF$2.25
Florida Univ Gainesville Dept of Industrial and Systems Engineering
An Optimum Multiple-Launch Program for Artificial Satellites,
B. D. Sivazlian. Mar 73, 9p ARO-11621.11-M
Grants DA-ARO-D-31-124-73-G149, AF-AFOSR-2605-74
Availability: Pub. in Opsearch, v11 n2-3 p131-137 Jun-Sep 74.

Descriptors: *Artificial satellites, *Multilaunching, Cost effectiveness, Communication satellites, Economics, Optimization, Factor analysis, Life expectancy, Replacement, Blackout(Propagation), Stochastic processes, Cost analysis, Reprints.
Identifiers: Economic analysis.

The economic analysis of a communication satellite system in uncontrolled orbits in which dispersed satellites operate in a single low orbit will depend on several factors among which the feasibility of a multiple or modular launch, the life span of a given satellite, the minimum number of operating satellites dictated by the black-out probability, the cost of a launch and that of investment. These factors are simultaneously incorporated to arrive at an optimum satellite replenishment program to minimize the total expected cost per unit time. (Author)

AD-A011 576/6GA PC$8.75/MF$2.25
Chrysler Corp New Orleans La Space Div
Optical Angular Motion Sensor.
Final rept. 1 Oct 73-30 Apr 75 on Phase 1,
H. T. Braswell, J. W. Fontenot, L. L. Hartley, B. F. Heinrich, and W. E. Miller. 1 Apr 75, 284p
SAMSO-TR-75-120
Contract F04701-74-C-0062

Descriptors: *Spacecraft components, *Alignment, *Optical equipment, Optical detectors, Optical equipment components, Light emitting diodes, Electronic equipment, Brassboard models.
Identifiers: *Optical angular motion sensors, *Angular alignment.

The Optical Angular Motion Sensor (OAMS) Program, Phase I, consisted of the design, fabrication, test and analysis of a Triaxial Angular Motion Sensor. A brassboard system was fabricated and assembled. It included a transmitter, a receiver assembly and an electronics assembly. The alignment information was transmitted between the transmitter and receiver on three discrete polarized light beams. The detail design and supporting analysis for the brassboard demonstration model includes electronics and optical components, thermal analysis, compensation circuitry and environmental stability to demonstrate the performance requirements. The selection of parts, materials and processes for the design and fabrication were in accordance with the required specifications.

N75-22366/9GA PC$6.25/MF$2.25
Texas Univ., Austin. Dept. of Aerospace Engineering and Engineering Mechanics.
The Effect of Surface Temperature and Reynolds Number on the Leeward Heat-Transfer for a Shuttle Orbiter.
J. J. Bertin, G. Senalug, M. Mcbride, and R. B. Willman. Apr 75, 152p NASA-CR-141781, REPT-75002
Contract NAS9-13707

Descriptors: *Heat transfer, *Reynolds number, *Space shuttle orbiters, *Surface temperature, Angle of attack, Mach number, Pressure distribution, Spacecraft configurations.

For abstract, see STAR 1314

N75-22367/7GA PC$5.25/MF$2.25
Howard Univ., Washington, D.C. Dept. of Mechanical Engineering.
The Dynamics of Spin Stabilized Spacecraft with Movable Appendages, Part 1.
Final Report.
P. M. Bainum, and R. Sellappan. May 75, 121p
NASA-CR-142703
Contract NGR-09-011-053

Descriptors: *Spacecraft configurations, *Spacecraft stability, *Spin stabilization, Appendages, Control surfaces, Equations of motion, Numerical analysis.

For abstract, see STAR 1314

N75-22368/5GA PC$12.50/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Results of Investigations with an 0.015-Scale Model (49-0) of the Rockwell International Space Shuttle Vehicle 140A/B Configuration with Modified Oms Pods and Elevons in the AEDC Vkf Tunnel B (0A79).
Space Shuttle.
V. Esparza, and A. I. Lindsay. Apr 75, 541p
NASA-CR-141531, DMS-DR-2199
Contract NAS9-13247

Descriptors: *Elevons, *Pods (External stores), *Space shuttle orbiters, *Spacecraft models, *Wind tunnel tests, Aerodynamic configurations, Aerodynamic forces, Angle of attack, Reynolds number, Sideslip.

For abstract, see STAR 1314

N75-22504/5GA PC$15.25/MF$2.25
European Space Research Organization, Paris (France).
Large Structures for Manned Spacecraft: Mathematical Analysis, Design, Construction and Tests.
Mar 74, 618p ESRO-SP-99
Conf-Proc. Of 3D Testing Symp., Frascati, Italy, 22-26 Oct. 1973.
Partly in English; Partly in French.

Descriptors: *Conferences, *Manned spacecraft, *Structural analysis, Aircraft structures, Finite element method, Mathematical models, Spacecraft structures, Structural design, Structural engineering, Structural reliability.

For abstract, see STAR 1314

N75-22760/3GA PC$3.25/MF$2.25
Office National d'Etudes et de Recherches Aerospatiales, Toulouse (France). Dept. d'Etudes et de Recherches en Technologie Spatiale.
Use of Thin Films for an Especially Hot in Space Satellite Coating Named Solar Absorber Application des Couches Minces a UN Type de Revetement pour Satellite, Particulierement Chaud dans l'Espace, Appele Absorbeur Solaire.
M. Riboulet. Nov 74, 13p ONERA-DERTS-NT-04-4
Language in French.

Descriptors: *French satellites, *Production engineering, *Solar energy absorbers, *Thermal control coatings, *Thin films, Environmental tests, Film thickness, Nondestructive tests, Vacuum deposition.

For abstract, see STAR 1314

N75-23163/9GA PC$4.25/MF$2.25
Analytical Research Labs., Inc., Monrovia, Calif.
Development of Spacecraft Toxic Gas Removal Agents.
Annual Summary Report.
R. S. Moore. Dec 74, 73p NASA-CR-141757, ARLI-3006-S
Contract NAS9-13746

Descriptors: *Air purification, *Exhaust gases, *Spacecraft cabin atmospheres, *Toxicity, Ammonia, Carbon monoxide, Charcoal, Lithium hydroxides, Spacecraft contamination, Transition metals.

For abstract, see STAR 1314

22C. Spacecraft Trajectories and Reentry

AD-A011 472/8GA PC$3.25/MF$2.25
Texas Univ At Austin
Dynamical Model Compensation for Near-Earth Satellite Orbit Determination.
Journal article,
Kenneth A. Myers, and Byron D. Tapley. 23 May 74, 9p ARL-75-0139
Grant AF-AFOSR-2233-72
Availability: Pub. in AIAA Jnl. v13 n3 p343-349 Mar 75.

Descriptors: *Orbits, Artificial satellites, Determination, Computerized simulation, Kalman filtering, Nonlinear systems, Algorithms, Dynamics, Compensation, Errors, Estimates, Low altitude, Accuracy, Reprints.
Identifiers: Near earth orbits.

Operational requirements in modern space applications often demand orbit determination accuracies which are limited by fundamental mathematical and computational restrictions. It is shown in realistic computer simulation studies how these difficulties can be alleviated for typical near-Earth satellites by employing dynamical model compensation (DMC) and accurate observations in the extended Kalman filter. Unmodeled and unknown accelerations affecting the motion of the satellite are effectively compensated by treating them as a first-order, Gauss-Markov stochastic process. Although conventional state noise compensation (SNC) can provide satisfactory results for many applications, the DMC method offers a significant increase in estimation accuracy. Numerical behavior of the DMC structure is summarized as a function of a priori statistical parameters to aid in filter design analyses for operational applications. (Author)

N75-22348/7GA PC$3.25/MF$2.25
Cincinnati Univ., Ohio. Dept. of Mathematics.
Analytical Theory for Artificial Satellites.
Final Technical Report.
A. Deprit. 15 May 75, 5p NASA-CR-142706
Contract NGR-36-004-068

Descriptors: *Analysis (Mathematics), *Artificial satellites, *Chebyshev approximation, *Orbital mechanics, Computer programs, Computer storage devices, Ephemerides, Nutation, Polynomials, Tracking networks.

For abstract, see STAR 1314

N75-22349/5GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
General Relativity and Satellite Orbits.
D. P. Rubincam. Mar 75, 41p NASA-TM-X-70880, X-921-75-56
Subm-Submitted for Publication.

Descriptors: *Equations of motion, *Newton theory, *Orbit calculation, *Relativity, *Trajectory analysis, Celestial mechanics, Euler-lagrange equation, Orbital mechanics.

For abstract, see STAR 1314

N75-22350/3GA PC$4.75/MF$2.25
Martin Marietta Corp., Denver, Colo. Planetary Systems Mission Analysis and Operations Section.
Mission Analysis Program for Solar Electric Propulsion (Mapsep). Volume 1: Analytical Manual for Earth Orbital Mapsep.
Apr 75, 88p NASA-CR-120406
Contract NAS8-29666
Misc-Revised.

Descriptors: *Earth orbits, *Mission planning, *Orbit calculation, *Solar electric propulsion, *User manuals (Computer programs), Guidance (Motion), Space navigation, Spacecraft configurations, Trajectory analysis.

For abstract, see STAR 1314

N75-22353/7GA PC$3.75/MF$2.25
Royal Aircraft Establishment, Bedford (England).
Geopotential Harmonics of Order 15 and Even Degree, from Changes in Orbital Eccentricity at Resonance.
D. G. King-hele, D. M. C. Walker, and R. H. Gooding. Sep 74, 33p RAE-TR-74120, BR43091

Descriptors: *Eccentricity, *Geopotential, *Satellite drag, *Satellite orbits, Ariel 3 satellite, Circular orbits, Cosmos satellites, Harmonic oscillation, Inclination, Resonance, Zonal harmonics.

For abstract, see STAR 1314

N75-22359/4GA PC$3.75/MF$2.25
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Stopwatch Observations of Satellites, October 1974.
R. D. Eberst. 19 Nov 74, 30p ROE-STS-195

Descriptors: *Cosmos satellites, *Optical tracking, *Satellite tracking, Agena d rocket vehicle, Explorer satellites, Noaa satellites, Skylab 1, Skylab 2, Skylab 3, Skylab 4, Td-1 satellite, Transit satellites.

For abstract, see STAR 1314

N75-22360/2GA PC$3.75/MF$2.25
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
Stopwatch Observations of Satellites, November 1974.
R. D. Eberst. 12 Dec 74, 34p 0ROE-STS-1960

Descriptors: *Cosmos satellites, *Optical tracking, *Satellite tracking, Agena d rocket vehicle, Explorer satellites, Nimbus satellites, Skylab 1, Skylab 2, Skylab 3, Skylab 4.

For abstract, see STAR 1314

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